

Prepared for:
Reilly Industries, Inc.
St. Louis Park, Minnesota



HEALTH AND SAFETY PLAN

Operations, Maintenance and Monitoring Activities
Reilly Industries, Inc. NPL Site
St. Louis Park, Minnesota

A handwritten signature in black ink, appearing to read "Peter Sullivan".

Prepared By Peter Sullivan, RHSM

September 25, 2007
Date

A handwritten signature in black ink, appearing to read "William M. Gregg".

Reviewed By Bill Gregg, Project Manager

October 25, 2007
Date

AECOM, Inc.
October 2009
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AECOM

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Emergency Information and Hazard Assessment

Operations and Maintenance Activities

Reilly Industries, Inc. NPL Site

St. Louis Park, Minnesota

Emergency References

Ambulance: 911

Fire: 911

Police: 911

Medical Services:

Methodist Hospital: Hospital Information
6500 Excelsior Blvd
Minneapolis, MN 55426
(952) 993 5000

Various working locations relative to this HASP exist for this project. Driving directions to the hospital from each location will be obtained and included for discussion as part of daily site EHS kick-off meetings.

When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.

Underground Utilities

<http://www.digsafely.com/contacts.htm>

Gopher State One Call

(800) 252-1166 or (651) 454-0002

Emergency Chemical Information

Chem-trec (Emergency Chemical Spill Response Information) (800) 424-9300

Poison Control Center

<http://www.aapcc.org/poison4.htm>

HENNEPIN REGIONAL POISON CENTER

Hennepin County Medical Center
 701 Park Avenue
 Minneapolis, MN 55415

This center is designated by the Minnesota Department of Health to answer calls from the general public and medical professionals

Emergency Phone: 1-800-222-1222 (voice and TTY)

Emergency Muster Point

Emergency muster points for each working location will be identified and discussed as part of the daily site EHS kick-off meeting.

Client Contacts:

	Office	Cell
MPCA – Nile Fellows	651-296-7299	
EPA - Darryl Owens	312-886-7089	
City of St. Louis Park - Scott Anderson	952-924-2557	
- William Gregg	952-924-0117	

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Hazard Assessment

Chemical Hazards

Coal tar compounds
 Creosote compounds
 Poly-nuclear Aromatic Hydrocarbons (PAH) including naphthalene
 Phenol

Chemical Name	PEL ¹	TLV ²	VP ₃	VD ⁴	SG ⁵	SO _L ⁶	FP ⁷	LE _L ⁸	UEL ₉
Creosote as CTPV	0.2 mg/m3	0.2 mg/m3	< 1	< 4	1.1	<1	> 200	?	?
Naphthalene	10	10	1	4.4	1.2	<1	189	0.9	5.9
Phenol	5 S	5 S	0.4	3.5	1.06	9	175	1.8	8.6

¹ Permissible Exposure Limit in ppm
² Threshold Limit Value in ppm
³ Vapor Pressure in mm Hg
⁴ Vapor Density (air = 1)
⁵ Specific Gravity (water = 1)
⁶ Solubility in Water in %

⁷ Flash Point in °F
⁸ Lower Explosive Limit in % by volume
⁹ Upper Explosive Limit in % by volume
 NA = Not Applicable
 ? = Not known
 C = Ceiling limit not to be exceeded
 S = Exposure limit based on skin exposure

Physical Hazards

Cold
 Compressed Gases
 Confined Spaces
 Dust
 Electrical 240 Volts AC
 Excavations
 Falling
 Falling Objects
 Flying Objects

Heat
 Heavy Equipment
 High Pressure Liquids
 Insects
 Lifting
 Noise
 Overhead Materials
 Overhead Utilities
 Pinch Points

Poisonous Plants
 Rotating Equipment
 Sharp Objects
 Splashing Liquids
 Traffic
 Tripping
 Underground Utilities
 Weather

Personal Protective Equipment

PPE Item	General	OM&M	Soil boring
Hard Hat	1, 2 & 3	2	✓
Traffic Vests	3	3	3
Steel Toed Safety Shoes	1	✓	✓
Safety Glasses with Side shields	1	✓	✓
Goggles or Face shield	4	4	4
Hearing Protection		5	✓
Tyvek Coveralls		6	6
Nitrile Gloves	6	6	6
Ivy Block® or Ivy Screen® barrier cream	7	7	7
Polycoated Tyvek coveralls with hood, double Nitrile gloves, rubber boots, and taped transitions.		8	8

✓ Required PPE

- 1 All employees must comply with Reilly Industries, Inc. safety requirements.
- 2 Hard Hats will be worn when there is potential for head impact injuries or electrocution hazards
- 3 Traffic vests and hardhats are required when working within twenty feet of any public road or any private road with active traffic.
- 4 Goggles or face shields shall be worn if a splash hazard exists or eye irritation is observed.
- 5 Hearing protection should be worn around soil boring equipment if normal conversation cannot be understood.
- 6 Tyvek coveralls and Nitrile gloves are only required of those that are likely to come in direct contact with potentially contaminated soils and/or groundwater. Tyvek coveralls and Nitrile gloves will be worn to protect workers from poison ivy and poison oak when contact cannot be avoided.
- 7 Ivy Block® or Ivy Screen® barrier cream should be worn on exposed skin where there is a potential for exposure to poison ivy or oak.
- 8 Polycoated Tyvek should be worn when chemicals of concern are highly permeable and present an absorption hazard to site workers.

Air Monitoring Instruments

Task	Instrument	Action Limit and Action
All tasks involving excavation or entry into a confined space	Oxygen meter	<19.5% or > 23.5% Entry into excavation or space not allowed.
All tasks involving potential flammable vapor concentrations above 10% of LEL	Explosive gas meter	Verify >19% oxygen for proper meter function >10% of LEL Shutdown all ignition sources until vapor level is controlled, exit work area until levels have dropped below 10% of LEL.
All tasks involving potential exposure to contaminated soils and/or groundwater	Photoionization Detector	5 ppm as isobutylene Sample colorimetric detector tubes, don respiratory protection as discussed in Section 7
All tasks involving potential exposure to contaminated soils and/or groundwater	Colorimetric detector tubes	>1/2 PEL for constituents of concern Don respiratory protection as discussed in section 7
All indoor tasks where hydrocarbon fuels are used for heating or powering equipment.	10 ppm carbon monoxide 25 ppm carbon monoxide	Begin ventilating area Evacuate area

Respiratory Protection

Task	Action Limit	Respiratory Protection	Level
All tasks involving potential exposure to contaminated soils and/or groundwater, other activities generating hazardous atmospheres.	5 ppm as Isobutylene for 1 minute on PID, or 5 ppm on colorimetric detector tub	Half or full face mask respirator with combination organic vapor/HEPA cartridges	C
	50 ppm as Isobutylene	Full face respirator with organic vapor/HEPA cartridges	C
	500 ppm as isobutylene	Supplied air respirator	B

I, 

certify that this hazard assessment and evaluation was performed on September 25, 2007.

1.0 INTRODUCTION

1.1 AECOM Safety Policy

AECOM, Inc. is committed to providing our employees with a safe and healthy work environment. It is not only our obligation to each other, but also a sound business practice to do so. Work related injuries and illnesses cause needless pain and suffering, cost money, and adversely affect our reputation with our clients. It is our firm belief that all work related injuries and illnesses are preventable, and it is therefore our goal to have a workplace that is free from occupational injuries and illnesses. Every attempt shall be made to eliminate the possibility of injuries and illnesses. No aspect of the company's activities, including expediency and cost, shall take precedence over the health and safety of our employees.

1.1.1 Maximum Duration of the Work Day for Field Activities

An employee may not work a shift that exceeds 16 hours in duration. For the purpose of this policy, the work shift includes time spent at lunch and on break. If an employee works more than one shift during the course of a calendar day, the total number of hours worked in that day cannot exceed 16 hours. Exception: If work is to be done continuously in ambient air temperatures of less than 20° F, the Site Safety Officer and Field Manager will use a guideline of limiting work shifts to 10 hours in duration, including 8 hours working outdoors and 2 hours of time spent at lunch, breaks, and travel. Refer to Section 5.15, Cold Stress, for further work day guidelines.

1.1.2 Short Service Employee

A Short Service Employee (SSE) is an employee with fewer than six months experience working supervised on field projects or an employee who has not completed required training or received required certifications.

Short Service Employees will not be assigned to this project unless they are supervised on site by a qualified person.

Short Service Employees will be identified in the field by a three inch long strip of red vinyl tape placed vertically on both sides of the SSE's hard hat. Note that clients may have specific procedures for identifying SSEs. The Project Manager must determine the identification method required by the client or project.

Field crews with less than five workers shall have no more than one SSE.

Field crews with five or more workers shall not have more than 20% SSE personnel.

1.2 Health And Safety Plan (HASP)

1.2.1 HASP Purpose

The purpose of this HASP is to identify hazards associated with this project and specify engineering and administrative controls and personal protective equipment necessary to mitigate the risks associated with these hazards. This HASP addresses the hazards recognized prior to writing or updating the documents. As new hazards are encountered, a Job Hazard Assessment (JHA) or Job Safety Analysis (JSA) must be conducted and the results input into the HASP.

This HASP also assigns responsibilities for the implementation of safety programs on this project and defines monitoring and emergency response planning specific to the project.

1.2.2 HASP Applicability

This site-specific Health and Safety Plan (HASP) has been developed by AECOM, Inc. (AECOM). It establishes the health and safety procedures required to minimize potential risk to AECOM and contractor personnel involved with the ongoing operations, maintenance and monitoring (OM&M) activities at the Reilly Industries, Inc. NPL Site in St. Louis Park, Minnesota.

The provisions of this plan apply to AECOM and AECOM subcontractor personnel who will potentially be exposed to safety and/or health hazards related to activities described in Section 3.0 of this document.

Client and third party employees performing work that potentially exposes them to the chemical hazards at the site must work under their own HASP or read, sign, and work under the requirements of this HASP.

This HASP has been written to comply with the requirements of the Occupational Safety and Health Administration (OSHA) Personal Protective Equipment Standard (29 CFR 1910.132) for all activities and the OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) for tasks where there are potential exposures to subsurface contaminants. All activities covered by this HASP must be conducted in complete compliance with this HASP and with all applicable federal, state, and local health and safety regulations. Personnel covered by this HASP who cannot or will not comply will be excluded from site activities.

This plan will be distributed to each employee involved with the proposed activities at the site, including subcontractor employees. Each employee must sign a copy of the attached health and safety plan sign-off sheet (see Attachment A).

This HASP only pertains to the tasks that are listed in Section 3.0. A task specific HASP or addendum to this HASP will be developed at a later date for any other subsequent investigative/remedial activities at the site.

1.3 Organization/Responsibility

The implementation of health and safety at this project location will be the shared responsibility of the AECOM Project Manager (PM), the AECOM Regional Health and Safety Manager (RHSM), the AECOM Project Site Safety Officer (SSO) and other AECOM personnel and AECOM's contractors implementing the proposed scope of work.

1.3.1 AECOM Project Manager

The AECOM PM (William Gregg) is the individual who has the primary responsibility for ensuring the overall health and safety of this project. As such, the PM is responsible for ensuring that the requirements of this HASP are implemented. Some of the PM's specific responsibilities include:

- Assuring that all personnel to whom this HASP applies, including AECOM subcontractors, have received a copy of it;
- Providing the RHSM with updated information regarding conditions at the site and the scope of site work;
- Providing adequate authority and resources to the on-site SSO to allow for the successful implementation of all necessary safety procedures;
- Supporting the decisions made by the SSO and RHSM;
- Maintaining regular communications with the SSO and, if necessary, the RHSM;
- Coordinating the activities of all AECOM subcontractors and ensuring that they are aware of the pertinent health and safety requirements for this project, and

- Conducting random project audits.

1.3.2 AECOM Regional Health and Safety Manager

The AECOM RHSM (Peter Sullivan) is the individual responsible for the preparation, interpretation and modification of this HASP. Modifications to this HASP which might result in less stringent precautions cannot be undertaken by the PM or the SSO without the approval of the RHSM. Specific duties of the RHSM include:

- Writing, approving and amending the HASP for this project;
- Advising the PM and SSO on matters relating to health and safety on this site;
- Recommending appropriate personal protective equipment (PPE) and respiratory equipment to protect personnel from potential site hazards;
- Facilitating Incident investigations; and,
- Maintaining regular contact with the PM and SSO to evaluate site conditions and new information which might require modifications to the HASP; and
- Conducting random project audits.

1.3.3 AECOM Site Safety Officer

All AECOM field technicians are responsible for implementing the safety requirements specified in this HASP. However, one field technician will serve as the SSO. The SSO will be appointed by the PM. The SSO will be on-site during all activities covered by this HASP. The SSO is responsible for enforcing the requirements of this HASP once work begins. The SSO has the authority to immediately correct all situations where noncompliance with this HASP is noted and to immediately stop work in cases where an immediate danger is perceived. Some of the SSO's specific responsibilities include:

- Assuring that all personnel to whom this HASP applies, including all subcontractors, have reviewed this HASP, and submitted a completed copy of the HASP review and acceptance form (Attachment A);
- Assuring that all personnel to whom this HASP applies have attended a pre-entry briefing and any subsequent safety meetings that are conducted during the implementation of the program;
- Maintaining a high level of health and safety consciousness among employees implementing the proposed investigative activities;
- **Securing Work Permits. The SSO must determine what, if any, work permits must be secured from the facility prior to the commencement of activities. If required, the SSO must determine how long the work permit is good for and verify that all the provisions of the work permit can be met by AECOM and its subcontractors.**
- Procuring the air monitoring instrumentation required and performing air monitoring for investigative activities;
- Procuring and distributing the PPE and safety equipment needed for this project for AECOM employees;
- Verifying that all PPE and health and safety equipment used by AECOM is in good working order;
- Verifying that AECOM contractors are prepared with the PPE, respiratory protection and safety equipment required for this program;
- Preparing an initial Job Safety Analysis (JSA) during the initial mobilization and revising the Job Safety Analysis if conditions or tasks change and communicating with all workers the results of the Job Safety Analysis. See attachment B for a JSA form. The JSA will be reviewed daily by all workers and updated as needed.

- Notifying the PM of all noncompliance situations and stopping work in the event that an immediate danger situation is perceived;
- Monitoring and controlling the safety performance of all personnel within the established restricted areas to ensure that required safety and health procedures are being followed;
- Conducting accident/incident investigations and preparing accident/incident investigation reports;
- Conducting the pre-entry briefing prior to beginning work and subsequent safety meetings as necessary; and
- Initiating emergency response procedures in accordance with Section 11.0 of this HASP.

1.3.4 AECOM Field Personnel

All AECOM field personnel covered by this HASP are responsible for following the health and safety procedures specified in this HASP and for performing their work in a safe and responsible manner. Some of the specific responsibilities of the field personnel are as follows:

- Assess each task prior to beginning work on that task for hazards and necessary precautions.
- Assess the work area for changing conditions and new hazards and address the hazards;
- Stop work and initiate corrective actions if work site hazards create unacceptable risk;
- Reading this HASP in its entirety prior to the start of on-site work;
- Submitting a completed HASP Review and acceptance form (Attachment A) to the AECOM SSO prior to the start of work;
- Attending the required pre-entry briefing prior to beginning on-site work and any subsequent safety meetings that are conducted during the implementation of the program;
- Bringing forth any questions or concerns regarding the content of the HASP to the PM or the SSO prior to the start of work;
- Reporting all Incidents, injuries and illnesses, regardless of their severity, to the AECOM SSO; and,
- Complying with the requirements of this HASP and the requests of the SSO.

1.3.5 Contractors

Additionally, contractors hired by AECOM are responsible for:

- Reading the HASP in its entirety prior to the start of on-site work;
- Attending the required pre-entry briefing prior to beginning on-site work and any subsequent safety meetings that are conducted during the implementation of the program;
- Ensuring that their equipment is in good working order via daily inspections;
- Operating their equipment in a safe manner;
- Appointing an on-site safety coordinator to interface with the AECOM SSO;
- Providing AECOM with copies of material safety data sheets (MSDS) for all hazardous materials brought on-site; and,
- Providing all the required PPE, respiratory equipment and safety supplies to their employees.

1.4 Management of Change/Modification of the HASP

1.4.1 Management of Change

This document discusses the physical hazards associated with the proposed activities. However, unanticipated site-specific conditions or situations might occur during the implementation of this project. Also, AECOM and/or the contractors may elect to perform certain tasks in a manner that is different from what was originally intended due to a change in field conditions. As such, this HASP must be considered a working document that is subject to change to meet the needs of this dynamic project.

AECOM and/or AECOM's contractors will complete a Job Safety Analysis (JSA) when new tasks or different investigative techniques not addressed in the HASP are proposed. The use of new techniques will be reviewed and if new hazards are associated with the proposed changes, they will be documented on the JSA form. An effective control measure must also be identified for each new hazard. JSA forms will be reviewed by the SSO prior to being implemented. Once approved, the completed forms will be reviewed with all field staff during the daily safety meeting. A blank JSA form is presented as Attachment B.

1.4.2 HASP Modification

Should significant information become available regarding potential on-site hazards, it will be necessary to modify this HASP. All proposed modifications to this HASP must be reviewed and approved by the AECOM RHSM before such modifications are implemented. Any significant modifications must be incorporated into the written document as addenda and the HASP must be reissued. The AECOM PM will ensure that all personnel covered by this HASP receive copies of all issued addenda. Sign-off forms will accompany each addendum and must be signed by all personnel covered by the addendum. Sign-off forms will be submitted to the AECOM PM. The HASP addenda should be distributed during the daily safety meeting so that they can be reviewed and discussed. Attendance forms will be collected during the meeting.

2.0 Site Description and History

2.1 Site Description

The Reilly Industries, Inc. NPL site is located in St. Louis Park, Minnesota. Historic operations, as mentioned below, have impacted aquifers underlying the city, and as a result, there are on-going OM&M activities at the facility.

2.2 Site History

Groundwater in the City of St. Louis Park, Minnesota, has been found to contain polynuclear aromatic hydrocarbons (PAH) as a result of activities at a coal-tar distillation and wood preserving plant (Site) operated from 1917 to 1972. Numerous previous studies have identified PAHs in various aquifers beneath St. Louis Park and adjacent communities.

The United States Environmental Protection Agency (EPA), the Minnesota Pollution Control Agency (MPCA), the Minnesota Department of Health (MDH), the City of St. Louis Park (City), and Reilly Industries, Inc. (formerly Reilly Tar & Chemical Corporation - Reilly) have agreed to acceptable water quality criteria for PAH.

2.3 Contaminants of Concern

Contaminants of concern are currently identified as being:

- Coal tar compounds
- Creosote compounds
- Poly-nuclear Aromatic Hydrocarbons (PAH) including naphthalene
- Phenol

3.0 Scope of Work and Assumptions

3.1 Project Goals

The purpose of OM&M activities is to treat and monitor underlying groundwater aquifers to identify the distribution of PAH in the groundwater and compare PAH levels in groundwater with those of historic monitoring as well as water quality criteria established in the Consent Decree-Remedial Action Plan.

3.2 Field Tasks

The specific field tasks currently being implemented at the site include:

- Monitoring and sampling of groundwater;
- Operations, maintenance and sampling of a granulated activated carbon groundwater treatment system; and,
- Possible expansion of field tasks to include:
 - Soil boring
 - Air monitoring activities associated with vapor intrusion, possibly including residential basements; and
 - Excavation activities

3.3 Assumptions

- All work can be performed using Level D Personal Protective Equipment;
- Site management will assist in locating subsurface utilities, vessels, and structures located on the property and outside the scope of the utility locator service; and
- No confined spaces will be entered on this project.

4.0 Chemical Hazard Assessment and Control

4.1 Chemical Contaminants of Concern

4.1.1 Coal Tar

Typical coal gasification byproduct (coal tar) constituents are referred to as polycyclic aromatic hydrocarbon (PAH) compounds. Repeated contact with PAH compounds may cause photosensitization of the skin, producing skin burns after subsequent exposure to ultra-violet light. Repeated contact with certain PAHs has been associated with the development of cancer.

Of the PAH compounds typically present at MGP sites, naphthalene is typically present at higher concentrations than the other compounds. Naphthalene is easily detected due to its characteristic moth-ball like odor. The inhalation of high concentrations of naphthalene vapor may result in nausea, vomiting, abdominal pain and irritation of the bladder. Prolonged overexposure may result in renal shut down.

Phenolic compounds are often associated with coal tars. Phenolics are generally strong irritants that can have a corrosive effect on the skin and can also penetrate the skin. Chronic overexposure to phenol and phenolic compounds may result in liver and kidney damage.

4.1.2 Creosote

Creosote is the name used for a variety of products: wood creosote, coal tar creosote, coal tar, coal tar pitch, and Coal Tar Pitch Volatiles (CTPV). These products are mixtures of many chemicals created by high-temperature treatment of beech and other woods, coal, or from the resin of the creosote bush. Cresol is a colorless to yellow liquid, with characteristic odor. The substance decomposes on burning producing toxic and irritating fumes. Cresol will react with strong oxidants. OSHA and the ACGIH have established eight-hour exposure limits of 5 ppm based on skin contact. Cresol will penetrate intact skin.

Breathing vapors of the creosotes, cresol, coal tar, coal tar pitch, or coal tar pitch volatiles can cause irritation of the respiratory tract. Eating large amounts of creosote (any form) may cause a burning in the mouth and throat and stomach pains. Eating large amounts of herbal remedies containing creosote bush leaves may cause liver damage, while large amounts of coal tar creosote may result in severe skin irritation, eye burns, convulsions, unconsciousness, and even death.

4.1.3 Naphthalene

Inhalation of dust or vapors can cause headache, nausea, vomiting, extensive sweating, and disorientation. The predominant reaction is delayed intravascular hemolysis with symptoms of anemia, fever, jaundice, and kidney or liver damage.

Contact with Naphthalene can irritate the skin and, prolonged contact, may cause rashes and allergy. "Sensitized" individuals may suffer a severe dermatitis.

4.1.4 Phenol

Phenol is a combustible liquid, corrosive, hygroscopic, and light sensitive material. This substance has caused adverse reproductive and fetal effects in animals, can cause Central Nervous System (CNS) depression, central nervous system effects, eye and skin burns, liver and kidney damage, severe respiratory tract irritation with possible burns, and severe digestive tract irritation with possible burns. Phenol can be harmful if inhaled, swallowed, or absorbed through the skin.

Eye contact with liquid or vapor causes severe burns and possible irreversible eye damage and can cause chemical conjunctivitis and corneal damage.

Phenol is harmful if absorbed through the skin, direct skin contact results in white, wrinkled discoloration, followed by severe burns. Phenol solutions may be absorbed through the skin rapidly to cause systemic poisoning and possible death.

4.1.5 Polynuclear Aromatic Hydrocarbons (PNA's, PAH's, Polycyclic-. Semi-volatiles)

Polynuclear Aromatic Hydrocarbons are various combinations of three or more closed (benzene) rings, together with attached molecular structures. They occur naturally in coal, petroleum, tars, pitches, and woods, and may be formed in fires involving heavy hydrocarbon materials.

Examples of PAH's, or PNA's, are anthracene, benzo(a)pyrene, chrysenes, fluoranthcene, naphthacene, and pyrenes, among many others. Many of the PAHs are carcinogenic. As a class they should be treated as carcinogens and exposures kept to a minimum. There are no OSHA permissible exposure limits for most of the specific compounds, however the "Coal Tar Pitch Volatiles" PEL should be used (0.2 mg/m³). PAHs are generally solids and not very volatile, making ingestion or inhalation of dust or smoke the likely routes of exposure.

4.1.6 Dust

Dust generated during coring or cutting of concrete, boring, or excavations can be hazardous to the respiratory system and irritating to the eyes. Dust can also carry the contaminants of concern potentially exposing workers by skin contact and inhalation. The ACGIH has established an eight-hour exposure limit for dust at 3 mg/M³. The concentrations of the chemicals of concern in the soil are low enough that inhalation of dust would not by itself be an exposure hazard. However contamination of skin and clothing can provide additional exposures. Therefore the generation and contact with dust should be minimized.

Water or other methods should be used to control dust during dusty operations; however care must be used to prevent electrical shock if electric tools are used in the same area. If dusts become irritating and engineering controls such as the application of water can not be used, respirators should be donned as discussed in Section 7.

4.2 Summary of Hazardous Properties of Potential Contaminants

Chemical Name	PEL ¹	TLV ²	VP ₃	VD ⁴	SG ⁵	SO L ⁶	FP ⁷	LE L ⁸	UEL ⁹
Creosote as CTPV	0.2 mg/m ³	0.2 mg/m ³	< 1	< 4	1.1	<1	> 200	?	?
Naphthalene	10	10	1	4.4	1.2	<1	189	0.9	5.9
Phenol	5 S	5 S	0.4	3.5	1.06	9	175	1.8	8.6

¹ Permissible Exposure Limit in ppm
² Threshold Limit Value in ppm
³ Vapor Pressure in mm Hg
⁴ Vapor Density (air = 1)
⁵ Specific Gravity (water = 1)
⁶ Solubility in Water in %

⁷ Flash Point in °F
⁸ Lower Explosive Limit in % by volume
⁹ Upper Explosive Limit in % by volume
 NA = Not Applicable
 ? = Not known
 C = Ceiling limit not to be exceeded
 S = Exposure limit based on skin exposure

4.3 Hazard Substances Brought On Site by AECOM

A material safety data sheet (MSDS) must be available for each hazardous substance that AECOM or its contractors bring on the property. This includes solutions/chemicals that will be used to decontaminate sampling equipment and gases needed to calibrate air monitoring equipment.

In addition, all containers of hazardous materials must be labeled in accordance with OSHA's Hazard Communication Standard. Either the original manufacturer's label or an NFPA 704M label specific for the material (as shown at the right) is considered to be an acceptable label.



4.4 Chemical Exposure and Control

4.4.1 Chemical Exposure Potential

Employees can be exposed by inhalation to the chemicals of concern during the installation of the soil borings and sampling activities. Another route of potential exposure to the contaminants of concern is via direct dermal contact with soils and groundwater during sampling.

Although highly unlikely, exposure to all of the contaminants of concern can occur via ingestion (hand-to-mouth transfer). The decontamination procedures described in Section 9.0 address personal hygiene issues that will limit the potential for contaminant ingestion.

4.4.2 Chemical Hazard Control

The chemical hazards associated with the investigative and sampling activities can be controlled in several ways, including:

AECOM will perform air monitoring (Section 6) in the worker's breathing zone to determine exposure to the chemicals of concern during the installation of soil borings and the sampling program. If exposures exceed the action levels, respiratory protection as discussed in Section 7, will be donned.

To avoid direct dermal contact with contaminated media, protective clothing, as described in Section 7 will be required when collecting samples and decontaminating sampling equipment.

4.4.3 Hazardous Waste Management

Waste generated as a result of OM&M or investigation activities will be containerized local to the point of generation, sampled for characterization purposes and secured prior to off-site transportation and disposal. Upon receipt of analytical results, the AECOM project team will work with the Client to properly characterize, profile and dispose of the waste(s).

5.0 Physical Hazards and Controls

5.1 Back Safety

Using the proper techniques to lift and move heavy pieces of equipment is important to reduce the potential for back injury. The following precautions should be implemented when lifting or moving heavy objects:

- Bend at the knees, not the waist. Let your legs do the lifting;
- Do not twist while lifting;
- Bring the load as close to you as possible before lifting;
- Be sure the path you are taking while carrying a heavy object is free of obstructions and slip, trip and fall hazards;
- Use mechanical devices to move objects that are too heavy to be moved manually; and,
- If mechanical devices are not available, ask another person to assist you.

5.2 Cuts and Lacerations

Geoprobe soil samples are collected in acetate liners that must be cut open in order to collect the sample. Additionally, tubing will need to be cut to facilitate groundwater sampling. Tube-cutters are available and should be used to eliminate this hazard. However, if it is necessary to use knives or blades, follow the safety precautions listed below:

- Keep your free hand out of the way
- Secure the acetate liner so it won't roll or move while you are cutting
- Use only sharp blades; dull blades require more force which results in less knife control
- Pull the knife at an angle to your body; pulling motions are easier to manage
- Don't put your knife in your pocket
- Use a hooked knife (i.e. linoleum knife) or a utility knife with a self-retracting blade
- Wear leather or Kevlar® gloves when using knives or blades.

5.3 Drilling Hazards

Use of a drill rig to advance soil borings and install monitoring wells will require all personnel in the vicinity of the operating rig to wear steel-toed boots, hard hats, hearing protection and safety eyewear. Personnel shall not remain in the vicinity of operating equipment unless it is required for their work responsibilities.

Additionally, the following safety requirements must be adhered to:

- All drill rigs and other machinery with exposed moving parts must be equipped with an operational emergency stop device. Drillers and geologists must be aware of the location of this device. This device must be tested prior to job initiation and periodically thereafter. The driller and helper shall not simultaneously handle augers unless there is a standby person to activate the emergency stop.
- The driller must never leave the controls while the tools are rotating unless all personnel are kept clear of rotating equipment.

- A long-handled shovel or equivalent must be used to clear drill cuttings away from the hole and from rotating tools. Hands and/or feet are not to be used for this purpose.
- A remote sampling device must be used to sample drill cuttings if the tools are rotating or if the tools are readily capable of rotating. Samplers must not reach into or near the rotating equipment. If personnel must work near any tools, which could rotate, the driller must shut down the rig prior to initiating such work.
- Driller's Drillers, helpers and geologists must secure all loose clothing, long hair, or jewelry when in the vicinity of drilling operations.
- Only equipment, that has been approved by the manufacturer, may be used in conjunction with drilling equipment Pins that protrude excessively from augers shall not be allowed
- No person shall climb the drill mast while tools are rotating.
- No person shall climb beyond 6 feet above ground on the drill mast without the use of ANSI-approved fall protection (approved belts, lanyards and a fall protection slide rail) or portable ladder that meets the requirements of OSHA standards.
- When using the rig's hoist to lift or move objects other than the equipment associated with the direct push operation, an assessment of the force required to perform the lift and the rig's design specifications must be made to determine whether the lift can be made safely. In all cases personnel must not be in line with the cable when it is under tension.

5.3.1 Rotating Parts

Exposure to rotating parts can occur when working near the drilling rig or the internal combustion engine. All rotating parts should be covered with guards to prevent access by workers. When performing maintenance activities that require the rotating parts to be exposed, workers should not allow loose clothing, hands, or tools to approach the rotating parts. Guards must be replaced as soon as possible after completing the maintenance task.

5.4 Driving Safety

Drivers must be licensed to drive the class of vehicle they are operating and trained in defensive driving. Only AECOM personnel may drive AECOM vehicles or vehicles rented for AECOM business; client, subcontractor, or other work-related personnel may ride. Drivers and passengers must comply with all traffic laws and posted signs, and will not operate a vehicle if under the influence of impairing medication, alcohol, or any other substance.

Planning / Preparation

- Prior to departure, check traffic reports, weather conditions, road construction, and road closures. If necessary, develop an alternate route and new, approved JMP (Journey Management Plan).
- Prior to entering the vehicle, inspect the vehicle.
- Leave early to allow for contingencies.

DOT

If you are to operate a vehicle exceeding 10,000 pounds (or vehicle and trailer with a combined weight over 10,000 pounds), or you are to transport greater than 1,000 pounds of hazardous materials, you **MUST** comply with DOT regulations. These are **NOT** addressed in this HASP; contact the H&S Department if this applies.

Distractions

You must NOT operate a vehicle while talking on your cell phone, regardless of "hands free" or not. If you receive a call, pull over to answer it. Do NOT allow other distractions to interfere with your safe operation of the vehicle.

Secure Packing

Do not move your vehicle unless all equipment and supplies are secured. Items and material which may roll, slide, or move about in your vehicle while traveling are a major hazard. Secure the load!

Emergency Procedures:

Always move out of traffic if possible; even if those in front of you have stopped. Stopping on an active highway can precipitate being hit from the rear. If you must stop on an active roadway, leave at least one car length in front of you, and watch the rear mirror, so you can ease up if someone behind can't stop. Keep your flashers on in this situation. If you are the only driver coming to a stop on an active roadway, leave the flashers on and when safe to do so, exit the car and get to a safe location.

If you must stop due to vehicle failure, etc. try to coast out of traffic. Put on your flashers, and tie a white handkerchief, etc. on the driver's side door or mirror. If you remain in the vehicle, lock the doors. Use your cell phone to summon help.

5.5 Dust

Dust may be generated as a result of Geoprobings activities. Dust can pose a hazard as an exposure route for chemicals of concern entrained within soil particulates. Air monitoring, as described in Section 6, and respiratory protection, as described in Section 7, shall be employed to reduce employee exposure potential.

5.6 Excavation

Excavation activities can pose numerous hazards to employees working in or around open excavations. Incorporate the following into excavation planning activities:

5.6.1 Conditions for Entry

Stability and safety of the excavation is a top safety concern. If employees are intended to enter an excavation greater than 4 feet in depth, the following must occur:

- A means for protecting employees within the excavation must be selected by a qualified and competent person, as defined by OSHA. Protection may include, but not be limited to, the use of trench boxes, sloping, or shoring to ensure that cave-in does not threaten employee safety. Employees may only work within the protected portion of the excavation.
- Prior to employees entering the excavation, the competent person shall test the atmosphere for hazardous conditions. The competent person shall monitor for, in the order listed: oxygen concentration, explosive potential expressed as a percentage of the lower explosive limit (LEL), and hazardous chemical substances.
 - Oxygen will be tested for using an oxygen meter – Oxygen must be between 19.5% and 23.5% for an employee to enter. Less than 19.5% is considered oxygen deficient and can lead to asphyxiation. Greater than 23.5% is considered oxygen-enriched and can lead to fire or explosion. Additionally, at least 19% oxygen is needed in order for LEL to be measured.

- LEL – If an LEL is in excess of 10% of the substance being measured, the atmosphere will be considered hazardous and entry into the excavation may not proceed.
- Hazardous chemical substances – A photoionization detector (PID), flame ionization detector (FID), colorimetric detector tubes, or other devices capable of monitoring for specific site contaminants will be used to monitoring for the presence of an airborne chemical in excess of it's OSHA permissible exposure limit (PEL).

All air monitoring results will be documented, and air monitoring will continue while employees are within the exaction. If at any point a prohibited condition, as discussed above, is encountered, employees will be ordered out of the excavation and work will not proceed until levels have returned to within operational parameters.

- Access and Egress. Employees will have a means for entering and exiting the excavation within a maximum of 25 feet of lateral travel. All ladders, stairs, or other devices used for exiting the excavation will extend 3 feet beyond the top of the excavation to allow employees a safe means for exiting.
- Excavated spoils will not be placed within 2 feet of the edge of the excavation. Spoils shall also be placed in such a manner as to divert rainwater away from the excavation.
- Excavations shall be clearly marked and barricaded to prevent other site workers, pedestrians and other passers-by from accidentally falling into the excavation. Barricades will also serve to protect heavy equipment and automobiles from intruding into the excavation.
- Utilities shall be marked and cleared as detailed later within this section of the HASP.
- If water, primarily seeping groundwater, is allowed to enter the excavation, a means for dewatering the excavation shall be provided. Accumulation of water within the excavation limits can lead to soil instability and a collapse of the excavation.

5.7 Flying Objects

Site activities have the potential to produce flying objects and debris. Proper PPE, as described in section 7, shall be worn to prevent injury from and exposure to flying objects and projectiles.

5.8 Hand Augering

In addition to the precautions listed in the Back Safety discussion below, additional care should be taken to prevent injuries when using hand augers.

- When practical, work as a team of two to advance borings with a hand auger.
- Wear cotton or leather gloves when rotating the auger.
- Avoid putting pressure on the palms of your hands; use a good grip to spread the pressure over the entire hand.
- Take frequent stretch breaks to stretch and relax your back, arms and hands.

5.9 Hand Safety

5.9.1 Glove Selection

To protect onsite workers from hand injuries, the following gloves will be used for when performing a specific duty:

Brightly colored gloves will be used to help emphasize and easily locate the hands. The color of gloves will be changed monthly to draw attention to the hands.

Pinch points are found between a moving object and a stationary object, or between two continuously moving objects. Yellow hand stickers will be placed on equipment to remind workers of pinch points.

5.9.2 Hand Tools

Rules for the safe use of hand tools:

- Select the right size tool for the job. Don't use "cheaters" and avoid pulling old tools from the waste stream. There's a reason why they were thrown away!
- All hand tools must be in safe condition.
- Handles must be sound, straight and tight-fitting.
- Always inspect tools before use and replace or repair worn or damaged tools.
- Always keep the cutting edges sharp and never test a cutting edge with your finger.
- When working on an elevated surface (ladder, truck, scaffold), ensure your tools are secure. Falling tools can cause serious injury.
- Always carry your tools correctly and never put sharp or pointed tools in your pocket.
- When carrying hand tools, always point the cutting edge to the ground.
- Always keep your tools in a dry place to prevent rust.
- Cutting tools must be kept sharp and properly shaped.
- Secure work pieces prior to cutting or drilling.
- Keep the unused hand and other people away from the tool.

Use the following types of tools while working:

Screwdrivers:

Most screwdrivers are not designed to be used on electrical equipment. Use an insulated screwdriver for electrical work.

Do not hold an object in the palm of one hand and press a screwdriver into it; place the object on a bench or table. Never hammer with a screwdriver. Never use a screwdriver with a broken handle, bent or burred blade, etc.

Pliers:

Do not use pliers as a substitute for hammers, wrenches, pry bars, etc. Use insulated pliers when doing electrical work. Inspect the pliers frequently to make certain that they are free of breaks or cracks.

Use the right type of pliers for the specific task – adjustable, locking (Vise Grip®), standard, bolt size fit, pipe wrench.

Hammers:

Use the correct hammer for the specific type of striking work (task) to be done. Always wear safety glasses when using a hammer to strike an object. Always use the claw portion of a hammer to remove nails and not as a pick or awl. Have an unobstructed view and swing when using a hammer. Watch for overhead interference on back and forward swing. Use a good grip and use something other than your hand to hold a nail when starting hammering. Check for defects on the handle and head before using. If the hammer head shows signs of mushrooming, replace it immediately.

Handles may be wood, tubular/solid steel or fiberglass. Replace any hammer with a loose handle before the head flies off and causes injury to you or someone else. Tighten loose handles with the proper wedges; never use nails or staples for wedges. If a steel or fiberglass handle is loose replace it, since it is more difficult to repair than a wooden one. Some fiberglass handles can be tightened with the aid of a repair kit with epoxy materials.

Wrenches:

Select the correct size of wrench for the job. Never use a pipe wrench as a wrench handle extension. Too much leverage can ruin a tool and cause injury.

To avoid sudden slips, stand in a balanced position and always pull on the wrench instead of pushing against the fixed jaw, particularly when a pinch point is created. Wear gloves when using a wrench in a confined space.

Whenever possible use a box end wrench instead of an open end wrench to avoid slipping.

Chisels:

Always wear safety goggles or a face shield when using a chisel. Drive chisels outward and away from your body. Do not use chisels to pry. Keep edges sharp for most effective work and protect when not in use. Driven tools (chisels, punches, etc.) must be dressed to remove any mushrooming. Use the proper hammer when using a chisel.

Knives:

Always perform a thorough Job Safety Analysis (JSA) to define the proper cutting tool for the task.

Always place the item to be cut on a solid surface, attempt to hold the cut item without your hand and cut in a direction away from the body and hand.

Always keep hands and body clear of the knife stroke. Always keep the cutting tool blades sharp.

Make sure there is plenty of open space around you when using any cutting tool.

Use the following safer tools in replace of FOBK:

- Self-retracting utility knives
- Guarded utility knives
- Shears, snips, and/or scissors
- Concealed blade cutters
- Pipe cutters

- Specialty cutters (e.g. Geoprobe Acetate Liner Cutter)
- Ratcheting tools

5.10 Handling of Compressed Gases

Nitrogen or compressed air may be used to inflate the bladder pumps, calibrate and operate monitoring equipment, welding, pneumatic tools, and other tasks. Follow the compressed gas handling procedures as outlined below:

- Inspect all cylinders upon delivery and verify that they are properly labeled.
- Do not store cylinders in direct sunlight (increase in temperature will increase pressure)
- Use a cylinder dolly to move the cylinders.
- Keep cylinder valves closed at all times (except when in use)
- Open valves slowly and away from people
- Close the valve and relieve the pressure before removing the regulator
- When cylinders are not in use, regulators should be removed and the cylinder returned to the storage area
- Always keep the valve cap over the valve assembly when not in use (break in valve will cause cylinder to become a projectile).
- Cylinders must be stored in the upright position and must be secured by a chain or rope.
- Full and empty oxidizing gas cylinders (such as oxygen and compressed air) and fuel gas cylinders (such as hydrogen and acetylene) must be separated by at least ten feet
- Segregate empty cylinders from full cylinders.

5.11 Heavy Equipment

The use of heavy equipment for earth moving work poses potential hazards to employees. Such equipment can cause trauma injuries to the operator or nearby workers. It may also roll over, or fall on sloped ground or unstable soil. AECOM personnel are to remain clear of operating heavy equipment to the extent feasible.

Operators of earth moving must be experienced or trained in the use of the equipment. They must inspect the equipment each day before use to assure that it is in safe operational condition. The equipment must be set up in a stable configuration, with the outriggers fully extended and supported on stable soil to prevent rollover. The rear swing-radius must be barricaded to prevent injuries to persons passing behind the equipment.

When employees must work near the equipment, eye contact and clear communication must be maintained.

5.12 High Pressure Liquids

A high pressure steam cleaner will be used to decontaminate equipment after each drilling location. Workers using steam cleaning equipment or working within six feet of a steam cleaner in use must wear a face shield over their safety glasses or goggles. Heat protective gloves should be worn by workers handling the steam hose and nozzle. Long sleeve cotton shirts are recommended when using a steam cleaner.

- Never point the nozzle of the steam cleaner at any person.
- Avoid using the steam cleaner on containers of flammable liquids or gasses.
- Release the pressure before disconnection the nozzle or hoses.

5.13 Insects and Spiders

Spiders and wasps may be found in derelict buildings, sheltered areas, and even on open ground. Exercise care when collecting samples and avoid reaching into areas where visibility is limited. If stung by a wasp or

bee, or bitten by a spider, notify a co-worker or someone who can help if you should you have an allergic reaction. Stay calm and treat the area with ice or cold water. Seek medical attention if you have any reactions to the sting such as developing a rash, excessive swelling or pain at the site of the bite or sting or any swelling or numbness beyond the site of the bite or sting.

Black Widow Spider

Abdomen usually shows hourglass marking.
 The female is 3-4 centimeters in diameter.
 Have been found in well casings and flush-mount covers.
 Not aggressive, but more likely to bite if guarding eggs.
 Light, local swelling and reddening of the bite are early signs of a bite, followed by intense muscular pain, rigidity of the abdomen and legs, difficulty breathing, and nausea.
 If bitten, see physician as soon as possible.



Brown Spiders (Recluse)

Central and South U.S., although in some other areas, as well.
 ¼-to-½-inch-long body, and size of silver dollar.
 Hide in baseboards, ceiling cracks, and undisturbed piles of material.
 Bite either may go unnoticed or may be followed by a severe localized reaction, including scabbing, necrosis of affected tissue, and very slow healing.
 If bitten, see physician as soon as possible.



Studies have determined that repellants containing DEET as a main ingredient are most effective against spiders, mosquitoes, and other insects. DEET can be directly applied to the exposed skin of adults and/or clothing. Permanone® is another repellent however, it can only be directly applied to clothing.

5.14 Lockout/Tagout

5.14.1 Facility/Client Controlled Equipment

Unless otherwise instructed by the client or facility representative, AECOM employees are forbidden to lockout or tagout a piece of equipment at an operating facility where procedures are already in place and are performed by maintenance personnel or other facility employees. If AECOM needs to perform maintenance or repairs on a piece of equipment that is essential to AECOM's operations, arrangements must be made with the client for a facility employee to lockout the energy source. Never try to start machines or equipment that are locked or tagged. Consult with the client representative if you are unsure as to whether or not the person who locked the equipment is ready to release the lock.

5.14.2 AECOM Controlled Equipment

The procedures discussed below will be implemented in the unlikely event that facility representatives are not available to implement their own lockout/tagout procedures or if the equipment to be serviced/maintained is directly under the control of AECOM. An example of such a situation may be when AECOM is operating a bioremediation system, air monitoring equipment trailer, or any other type of system requiring electricity at 1) an abandoned property or 2) at a facility where the client has made AECOM responsible for locking or tagging energy sources that support the operation of AECOM owned, leased or rented equipment. AECOM procedures are not to be substituted for a client's procedures or implemented at an operating facility without the prior consent of the client or client's representative. The provisions of AECOM's lockout/tagout procedures apply only to those AECOM personnel who are authorized by their Regional Health and Safety Manager (RHSM) to perform lockout/tagout procedures and, where applicable, have also been authorized by the client's representative to perform lockout/tagout at their facility.

5.14.3 Sequence of Lockout

The authorized AECOM employee will implement the following procedural sequence. **Never take short cuts to by-pass a lockout or tagout.**

- Notify all affected employees, (including facility personnel where applicable), that servicing, maintenance or inspection is required on a machine or piece of equipment and that the machine must be locked out to perform the servicing, maintenance or inspection.
- Turn off the machine or piece of equipment and shut down or disconnect the local power source.
- Activate all energy isolating devices (switches, chains, etc.) to block energy flow from **every** source that feeds the equipment.
- Attach the lockout device to each energy isolating device such that the isolating device is held in a "safe" or "off" position. **Only standard AECOM locks and tags will be used. Locks and tags are available from your RHSM.**
- Fasten a lockout/tagout notice around the lock (see example in Section 8. - Attachments)
- Fasten a tagout device **only** if the isolating device cannot accommodate a lock. Fasten it in such a manner as will clearly indicate that the operation or movement of the isolating device from the safe or off position is prohibited. Fill out the tag completely and correctly. **Tags don't lockout energy. They only provide a warning about the dangers.**
- Release (bleed) all stored or residual energy once the locks and/or tags are in place.
- Verify that the isolation and de-energization of the machine or equipment has been accomplished. Test for zero energy by trying to turn on the equipment. If the equipment doesn't start up, it can be serviced safely.

5.14.4 Release of Lockout

Before lockout or tagout devices are removed and energy is restored, the following procedures will be implemented:

- Inspect the work area to verify that all nonessential items have been removed.
- Reinstall all machine guards (if removed during maintenance/repair).
- Notify all affected employees (including facility personnel where applicable) that the locks and/or tags are being removed.
- Verify that all equipment controls are in neutral.

- Remove the lockout and tagout devices. **The authorized employee who applied the lockout or tagout device is the only one who is authorized to remove it.** For greater safety, the key to each lock will be kept and used only by the individual involved in the lockout.
- Turn on the energy.

5.15 Noise Exposure

The use of drilling equipment can expose the field team to noise levels that exceed the OSHA PEL of 90 dB for an 8-hour day. Exposure to noise can result in the following:

- Temporary hearing losses where normal hearing returns after a rest period;
- Interference with speech communication and the perception of auditory signals;
- Interference with the performance of complicated tasks; and,
- Permanent hearing loss due to repeated exposure resulting in nerve destruction in the hearing organ.

Since personal noise monitoring will not be conducted during the proposed activities, employees must follow this general rule of thumb: If the noise levels are such that you must shout at someone 5 feet away from you, you need to be wearing hearing protection. Employees can wear either disposable earplugs or earmuffs but all hearing protection must have a minimum noise reduction rating (NRR) of 27 dB.

5.16 Overhead Lifts

Pulling material and equipment from wells during maintenance or well abandonment can be safely performed using hoisting equipment. This technique places the cable or chain under tension and creates a hazard if the cable or chain breaks or detaches from the load. AECOM personnel are to remain clear of this activity until the material has been set on the ground or trailers and rigging removed. **UNDER NO CIRCUMSTANCES ARE PERSONNEL TO PASS UNDER A SUSPENDED LOAD OR BE IN LINE WITH THE CABLE OR CHAIN UNDER TENSION.**

All workers not directly involved with the lift should remain outside the swing radius of the lifting equipment or the a radius equal to the height of the lifting equipment which ever is greater.

A Job Safety Analysis will be conducted prior to each overhead lift other than the routine handling of drill stem, augers, sample tubes, and push rods. See Attachment B.

5.17 Poisonous Plants

All undeveloped property potentially has poison ivy, oak, or sumac growing in areas where vegetation is not controlled. These plants can also be found in cultivated and landscaped areas. Use common sense when

<p><u>Poison Ivy</u> Grows in West, Midwest, Texas, East. Several forms – vine, trailing shrub, or shrub. Three leaflets (can vary 3-9). Leaves green in summer, red in fall. Yellow or green flowers. White berries.</p>	
<p><u>Poison Oak</u> Grown in the East (NJ to Texas), Pacific Coast. 6-foot tall shrubs or long vines. Oak-like leaves, clusters of three. Yellow berries.</p>	
<p><u>Poison Sumac</u> Grows in boggy areas, especially in the Southwest and Northern states. Shrub up to 15 feet tall. Seven to 13 smooth-edged leaflets. Glossy pale yellow or cream-colored berries.</p>	

If you must enter areas containing such plants, wear protective clothing, such as Tyvek® coveralls, Nitrile or latex gloves, and boot covers. The use of a barrier cream such as Ivy Block can prevent the active agent in poisonous plants from affecting skin and Tecnu cleansing wipes can remove the plant oil from exposed skin.

Avoid using mowers and weed trimmers in areas where poison ivy and oak are likely. Additional care should be taken during early winter after the leaves have fallen from the poisonous plants; the poison still exists in the vines and stubble remaining above the ground. Wash any contaminated skin immediately with cold water and mild soap.

5.18 Slips, trips and fall hazards

On any work area, it is expected that the ground might be uneven. The ground surface might be unreliable due to settling. Surface debris might be present and wet or swampy areas can exist.

Employees should walk around, not over or on top of debris or trash piles. When carrying equipment, identify a path that is clear of any obstructions. It might be necessary to remove obstacles to create a smooth, unobstructed access point to the work areas on site.

During the winter months, snow shovels and salt crystals or calcium chloride should be kept on site to keep work areas free of accumulated snow and ice. Furthermore, use sand or other aggregate material to help keep work surfaces from being slippery, especially where salt/calcium chloride cannot be used. In addition, make sure work boots have soles that provide good traction. When walking on ice is necessary crampons or Yaktrax® should be used.

Maintaining a work environment that is free from accumulated debris is the key to preventing slip, trip and fall hazards at construction sites. Essential elements of good housekeeping include

- Orderly placement of materials, tools and equipment;
- Placing trash receptacles at appropriate locations for the disposal of miscellaneous rubbish;
- Prompt removal and secure storage of items that are not needed to perform the immediate task at hand; and,
- Awareness on the part of all employees to walk around, not over or on, equipment that might have been stored in the work area.

5.19 Traffic Safety

Basic Procedures

To make certain that motorists are aware of our presence, all employees who are potentially exposed to traffic hazards should **wear orange or yellow ANSI Class II or III safety vests**. Work area should be delineated with traffic cones, or other suitable warning barriers, to prevent motorists from inadvertently driving through. As for vests, cones or other barrier materials should be reflectorized if work will be performed during dusk or evening hours. Where it is not feasible to implement such procedures, a standby observer should be assigned to warn the work crew of any impending traffic hazards.

Work On/Adjacent to Public Roadways

For projects that involve potential exposure to traffic on or adjacent to public roadways, consult the "**Work Zone Traffic Control**" handbook, under "Traffic Control" on AECOM's H&S Website, at the following web address: <http://intranet.aecom.com/healthweb>

The handbook was developed by the State of Maine DOT and provides examples of traffic control applications for typical road work situations (e.g., closure of one lane of a two lane road, stationary work on the shoulder of a road, mobile work along the shoulder of a road, etc.). Although it was written to reflect the basic requirements of Part VI of the Federal Highway Administration's (FHWA) Manual of Uniform Traffic Control Devices (MUTCD), this handbook is not a regulatory document. Since specific requirements will vary from state to state, and within a state, by county, city or town;

Flagging/Redirecting Traffic

Specific requirements exist when traffic must be redirected around a work area that is on or adjacent to a public roadway. In certain locations only police officers may redirect traffic. As a minimum, OSHA requires that flaggers be formally trained in accordance with the requirements specified in ANSI D6.1-1971. As a result, AECOM personnel should not redirect traffic on public roadways.

<http://www.atssa.com/cs/flagger>

- Texas Flagging Requirements:

- Certification required every three years;
- Hardhat required. DOT must wear white. Contractors wear any color;
- Reflectorized safety vests required. and

All training courses handled by ATSSA and Texas Engineering Extension Services.

When traffic must be redirected, and the local police do not perform that role, a traffic control firm should be hired (these are frequently listed in the yellow pages under "safety").

5.20 Utility Hazards

5.20.1 Underground Utilities

Law requires that a utility clearance be performed prior to initiation of any subsurface work.

Gopher State One Call

(800) 252-1166 or (651) 454-0002

to request a mark-out of natural gas, electric, telephone, cable television, water and sewer lines in the proposed drilling locations. In many locations, a separate location request must be submitted to the municipality providing potable water, sanitary and storm sewerage. Work will not begin until the required utility clearances have been performed.

Utility clearance organizations typically do not mark-out underground utility lines that are located on private property. As such, the drilling contractor must exercise due diligence and try to identify the location of any private utilities on the property being investigated. AECOM can fulfill this requirement in several ways, including:

- Obtaining as-built drawings for the areas being investigated from the property owner;
- Visually reviewing each proposed soil boring locations with the property owner or knowledgeable site representative;
- Performing a geophysical survey to locate utilities;
- Hiring a private line locating firm to determine the location of utility lines that are present at the property;
- Identifying a no-drill zone; or
- Hand digging in the proposed soil boring locations if insufficient data is available to accurately determine the location of the utility lines.

5.20.2 Overhead Utilities

All overhead lines will be considered "energized" unless properly de-energized, grounded and tested by the utility company before working within the clearance distance as defined below. The AECOM SSO must observe de-energizing process and reconfirm that the lines are de-energized on a daily basis.

Any vehicle or mechanical equipment that is capable of having parts of its structure elevated near energized overhead lines shall be operated so that a minimum clearance of 10 feet is maintained at all times. This 10 foot distance shall be increased a minimum of 0.4 inches for each 1 kV over 50 kV. If the voltage of the overhead line is unknown, maintain a clearance distance of 35 feet from ground projection of the nearest power line to the vehicle. Any work within the clearance distance must be approved by the Regional Health and Safety Manager and the utility company.

Precautions must be taken when handling lengths of pipe or tubing that can approach overhead power and utility lines. When working with pipe or tubing, maintain a distance equal to the length of pipe plus the clearance distance defined above.

5.21 Weather

5.21.1 Inclement Weather

The Site Safety Officer will check the weather forecast for the project area each morning prior to mobilization. Predicted weather conditions will be included in the Job Safety Analysis. Weather changes should initiate a review and update of the JSA as necessary.

Severe weather can occur with little warning. The employee must be aware of the potentials for lightning, flash flooding and high wind events.

Be Prepared, Know What is Coming your Way

- Listen to the radio for severe weather alerts.
- Check the Storm Prediction Center's web page for alerts and warnings.
<http://www.spc.noaa.gov/products/wwa/>
- Pay attention to the weather in your area, up wind of your location, and in the watershed up stream from your location.
- When in the field, be aware of the route you must take to get to shelter.
- When working in low areas be aware of the potential for flash flooding and the route to higher ground.

5.21.2 Heat Stress

Types of Heat Stress

Heat related problems include **heat rash, fainting, heat cramps, heat exhaustion and heat stroke**. **Heat rash** can occur when sweat isn't allowed to evaporate; leaving the skin wet most of the time and making it subject to irritation. **Fainting** may occur when blood pools to lower parts of the body and as a result, does not return to the heart to be pumped to the brain. Heat related fainting often occurs during activities that require standing erect and immobile in the heat for long periods of time. **Heat cramps** are painful spasms of the muscles due to excessive salt loss associated with profuse sweating.

Heat exhaustion results from the loss of large amounts of fluid and excessive loss of salt from profuse sweating. The skin will be clammy and moist and the affected individual may exhibit giddiness, nausea and headache.

Heat stroke occurs when the body's temperature regulatory system has failed. The skin is hot, dry, red and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. **EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH.** A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling.

Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks.

Early Symptoms of Heat-Related Health Problems:

decline in task performance	excessive fatigue
incoordination	reduced vigilance
decline in alertness	muscle cramps
unsteady walk	dizziness

Susceptibility to Heat Stress Increases due to:

lack of physical fitness	obesity
lack of acclimatization	drug or alcohol use
increased age	sunburn
dehydration	infection

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in PPE need to gradually adjust to the heat.

The Effect of Personal Protective Equipment

Sweating normally cools the body as moisture is removed from the skin by evaporation. However, the wearing of certain personal protective equipment (PPE), particularly chemical protective coveralls (e.g., Tyvek), reduces the body's ability to evaporate sweat and thereby regulate heat buildup. The body's efforts to maintain an acceptable temperature can therefore become significantly impaired by the wearing of PPE.

Measures to Avoid Heat Stress:

The following guidelines should be adhered to when working in hot environments:

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
- Identify a shaded, cool rest area.
- Rotate personnel, alternative job functions.
- Water intake should exceed sweat produced. Most workers exposed to hot conditions drink less fluids than needed because of an insufficient thirst. **DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK.** Consume enough liquid to force urination every two hours. In humid climates ice water or ice should be consumed to help maintain normal body temperature since evaporation does not provide an efficient mechanism for heat removal.
- Eat light meals before and during work shifts. Avoid highly salted foods.
- Drink sports drinks such as Gatorade® diluted 1:1 with water.
- Save most strenuous tasks for non-peak heat hours such as the early morning or at night.
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.
- Avoid double shifts and/or overtime.

The implementation and enforcement of the above mentioned measures will be the joint responsibility of the Project Manager and health and the Site Safety Officer. Potable water and fruit juices should be made available each day for the field team.

Heat Stress Monitoring Techniques

Site personnel should regularly monitor their heart rate as an indicator of heat strain by the following method:

Radial pulse rates should be checked by using fore-and middle fingers and applying light pressure top the pulse in the wrist for one minute at the beginning of each rest cycle. If the pulse rate exceeds 110 beats/minute, the next work cycle will be shortened by one-third and the rest period will be kept the same. If, after the next rest period, the pulse rate still exceeds 110 beats/minute, the work cycle will be shortened again by one-third.

5.21.3 Cold Stress

Type of Cold Stress

Cold injury is classified as either localized, as in frostbite, frostnip or chilblain; or generalized, as in hypothermia. The main factors contributing to cold injury are exposure to humidity and high winds, contact with wetness and inadequate clothing.

The likelihood of developing frostbite occurs when the face or extremities are exposed to a cold wind in addition to cold temperatures. The freezing point of the skin is about 30° F. When fluids around the cells of the body tissue freeze, skin turns white. This freezing is due to exposure to extremely low temperatures. As wind velocity increases, heat loss is greater and frostbite will occur more rapidly.

Symptoms of Cold Stress

The first symptom of frostbite is usually an uncomfortable sensation of coldness, followed by numbness. There might be a tingling, stinging or aching feeling in the affected area. The most vulnerable parts of the body are the nose, cheeks, ears, fingers and toes.

Symptoms of hypothermia, a condition of abnormally low body temperature, include uncontrollable shivering and sensations of cold. The heartbeat slows and can become irregular, the pulse weakens and the blood pressure changes. Pain in the extremities and severe shivering can be the first warning of dangerous exposure to cold.

Maximum severe shivering develops when the body temperature has fallen to 95° F. Productive physical and mental work is limited when severe shivering occurs. Shivering is a serious sign of danger. Immediately remove any person who is shivering from the cold.

Methods to Prevent Cold Stress

When the ambient temperature, or a wind chill equivalent, falls to below 40° F (American Conference of Governmental Industrial Hygienists recommendation), site personnel who must remain outdoors should wear insulated coveralls, insulated boot liners, hard hat helmet liners and insulated hand protection. Wool mittens are more efficient insulators than gloves. Keeping the head covered is very important, since 40% of body heat can be lost when the head is exposed. If it is not necessary to wear a hard hat, a wool knit cap provides the best head protection. A facemask may also be worn.

Persons should dress in several layers rather than one single heavy outer garment. The outer piece of clothing should ideally be wind and waterproof. Clothing made of thin cotton fabric or synthetic fabrics such as polypropylene is ideal since it helps to evaporate sweat. Polypropylene is best at wicking away moisture while still retaining its insulating properties. Loosely fitting clothing also aids in sweat evaporation. Denim is not a good protective fabric. It is loosely woven which allows moisture to penetrate. Socks with a high wool content

are best. If two pairs of socks are worn, the inner sock should be smaller and made of cotton, polypropylene or similar types of synthetic material that wick away moisture. If clothing becomes wet, it should be taken off immediately and a dry set of clothing put on.

If wind conditions become severe, it might become necessary to shield the work area temporarily. The SSO and the PM will determine if this type of action is necessary. Heated break trailers or a designated area that is heated should be available if work is performed continuously in the cold at temperatures, or equivalent wind chill temperatures, of 20° F.

Dehydration occurs in the cold environment and can increase the susceptibility of the worker to cold injury due to significant change in blood flow to the extremities. Drink plenty of fluids, but limit the intake of caffeine

5.21.4 Work/Rest Cycles for Cold Weather

If wind chill temperatures fall below **minus 25° F**, breaks from the cold will occur at a rate of one every hour. If wind chill temperatures fall below **minus 45° F**, all work will cease and persons will be required to go indoors. Also see Section 1.1.1 regarding shift duration. However, these guidelines can be modified at any time based on actual site conditions and professional judgment rendered by either the Field Manger and/or SSO. For example, the Field Manger and/or SSO will evaluate field crew fitness; the condition of their cold-weather gear, including boots; and will observe employees alertness, including fatigue and rate of cold tolerance/acclimation.

If weather conditions warrant, portable tents might become necessary to shield the work area from wind, rain, snow, etc. The SSO and the Field Manager will determine if this type of action is necessary. However, under no conditions will the tents be heated and as a precautionary measure, a Photoionization Detector (PID) with a 10.6 eV lamp will be used to monitor the breathing zone of personnel inside the tent. See Section 6 for action levels based on PID readings. A JSA should be prepared and discussed with all workers detailing the precautions for working in these cold weather conditions.

5.22 Well Development and Groundwater Monitoring

During purging and development of borings into monitoring wells, the PPE indicated in Section 7 below will be worn to avoid chemical contact / exposure, as well as physical trauma. Bailing wells requires proper gloves, eye protection, and possibly protective coveralls to prevent splashing. Back and lifting precautions outlined in Section 5.11 shall be used to avoid ergonomic injuries.

5.23 Confined Spaces

No confined space entries are planned or allowed on this project.

When working in industrial settings, it is common to need to enter a confined space to make observations, collect samples, or perform other duties. AECOM employees or sub contractors must not enter any confined space containing a hazard...

A confined space is defined as any space that meets the following criteria:

- Is not designed for human occupancy (excludes vehicles, elevator cabins etc.) (includes elevator shafts and wells, tanks, vaults, etc.)
- Is large enough to physically enter with the whole body, and
- Has a restricted exit path (you must climb over pipes, through man ways, etc.)

If the confined space contains any hazard, entry may only be made if permitted in writing by the space owner or the Regional Health and Safety Manger, the entry is monitored by an observer, and with the prior written approval of the AECOM Regional Health and Safety Manager.

Typical hazards include but are not limited to:

Flammable materials
Toxic materials
Corrosive materials

Exposed electrical circuits
Falls greater than six feet
Moving machinery

Oxygen deficient atmosphere

If there is any doubt about whether a space meets the above criteria, call the AECOM Health and Safety Staff.

6.0 Air Monitoring

6.1 Monitors

6.1.1 Oxygen Meter

An oxygen meter will be used to monitor all atmospheres requiring an explosive gas meter. The oxygen level will be determined prior to the explosive gas level to assure that there is sufficient oxygen to support both human life and to allow the explosive gas meter to operate properly.

6.1.2 Explosive Gas Meter

An explosive gas meter will be used to confirm that work area atmospheres contain less than 10% LEL before any cutting, welding, or other hot work is initiated and to monitor those areas during the activities.

An explosive gas meter will be used to determine and monitor the air quality in any confined space entered.

If the PID reading indicates a sustained (1 minute) concentration at any location in excess of 500 ppm as isobutylene or the instrument reads an off scale high concentration, a combustible gas meter will be obtained and used to verify that no concentrations exceed ten percent (10%) of the Lower Explosive Limit (LEL). If concentrations exceed 10% of LEL, all spark and heat producing equipment will be shut down until the concentration can be reduced below 10% of LEL.

6.1.3 Photoionization Detector

As a precautionary measure, a Photoionization Detector (PID) with a 10.6 eV lamp will be used to monitor the breathing zone of personnel during the proposed activities. If the PID indicates sustained (5 minute) breathing zone vapor concentrations in excess of 5 ppm as isobutylene, respiratory protection, as described in Section 7.2 of this document, will be donned.

6.1.4 Colorimetric Detector Tubes

If a properly calibrated PID reads 5 ppm as isobutylene sustained for 5 minutes colorimetric detector tubes, e.g. Draeger or Sensydine, shall be used to confirm the presence and concentration of site-specific chemicals of concern, e.g. naphthalene. If a site-specific chemical of concern is detected at concentration of half its' PEL then respiratory protection shall be used as described in Section 7.2 of this document.

6.1.5 Carbon Monoxide Meter

A carbon monoxide monitor will be used to monitor the air quality in any confined space to be entered and in any building or enclosed area where hydrocarbon fueled power equipment is used.

6.1.6 Dust/Particulate Meter

A particulate meter will be used to monitor dust levels within the work zone. If particulate levels exceed 1.5 mg/m^3 in air, respiratory protection, as described in Section 7.2 of this document, will be donned. Additionally, actions will be taken to suppress particulates in the work area.

Task	Instrument	Action Limit and Action
All tasks involving excavation or entry into a confined space	Oxygen meter	<19.5% or > 23.5% Entry into excavation or space not allowed.
All tasks involving potential flammable vapor concentrations above 10% of LEL	Explosive gas meter	Verify >19% oxygen for proper meter function >10% of LEL Shutdown all ignition sources until vapor level is controlled, exit work area until levels have dropped below 10% of LEL.
All tasks involving potential exposure to contaminated soils and/or groundwater	Photoionization Detector	5 ppm as isobutylene Sample colorimetric detector tubes, don respiratory protection as discussed in Section 7
All tasks involving potential exposure to contaminated soils and/or groundwater	Colorimetric detector tubes	>1/2 PEL for constituents of concern Don respiratory protection as discussed in section 7
All indoor tasks where hydrocarbon fuels are used for heating or powering equipment.	10 ppm carbon monoxide 25 ppm carbon monoxide	Begin ventilating area Evacuate area

6.2 Personal Air Sampling

The need for personal air sampling is not anticipated by AECOM during the activities covered by this HASP. The AECOM Project Manager, or the AECOM Regional Health and Safety Manager can prescribe personal air sampling based on observations or concerns recognized during the project.

6.3 Calibration and Recordkeeping

Equipment used by AECOM will be calibrated in accordance with AECOM's standard operating procedures. A log of the calibrations and readings will be kept in the field notebook. Daily calibration information will also be recorded in the field notebook.

7.0 Personal Protective Equipment

Personal protective equipment (PPE) will be worn during these activities to prevent on-site personnel from being injured by the safety hazards posed by the site and/or the activities being performed. In addition, chemical protective clothing will be worn to prevent direct dermal contact with the site's chemical contaminants. The following table describes the PPE and chemical protective clothing to be worn for general site activities and for certain specific tasks.

7.1 Personal Protective Equipment

PPE Item	General	OM&M	Soil boring
Hard Hat	1, 2 & 3	2	✓
Traffic Vests	3	3	3
Steel Toed Safety Shoes	1	✓	✓
Safety Glasses with Side shields	1	✓	✓
Goggles or Face shield	4	4	4
Hearing Protection		5	✓
Tyvek Coveralls		6	6
Nitrile Gloves	6	6	6
Ivy Block® or Ivy Screen® barrier cream	7	7	7
Polycoated Tyvek coveralls with hood, double Nitrile gloves, rubber boots, and taped transitions.		8	8

✓ Required PPE

- 1 All employees must comply with Reilly Industries, Inc. safety requirements.
- 2 Hard Hats will be worn when there is potential for head impact injuries or electrocution hazards
- 3 Traffic vests and hardhats are required when working within twenty feet of any public road or any private road with active traffic.
- 4 Goggles or face shields shall be worn if a splash hazard exists or eye irritation is observed.
- 5 Hearing protection should be worn around soil boring equipment if normal conversation cannot be understood.
- 6 Tyvek coveralls and Nitrile gloves are only required of those that are likely to come in direct contact with potentially contaminated soils and/or groundwater. Tyvek coveralls and Nitrile gloves will be worn to protect workers from poison ivy and poison oak when contact cannot be avoided.
- 7 Ivy Block® or Ivy Screen® barrier cream should be worn on exposed skin where there is a potential for exposure to poison ivy or oak.
- 8 Polycoated Tyvek should be worn when chemicals of concern are highly permeable and present an absorption hazard to site workers.

7.2 Respiratory Protection

Although not likely, respiratory protection as described below will be required if worker breathing zone PID concentrations are sustained above the action levels in the following table.

Task	Action Limit	Respiratory Protection	Level
All tasks involving potential exposure to contaminated soils and/or groundwater, other activities generating hazardous atmospheres.	5 ppm as Isobutylene for 1 minute on PID, or 5 ppm on colorimetric detector tub	Half or full face mask respirator with combination organic vapor/HEPA cartridges	C
	50 ppm as Isobutylene	Full face respirator with organic vapor/HEPA cartridges	C
	500 ppm as isobutylene	Supplied air respirator	B

Respiratory protection (half or full face mask respirator with combination organic vapor/HEPA cartridges) should also be donned if odors become objectionable at any time or if respiratory tract irritation is noticed.

All employees who are expected to don respiratory protection must have successfully passed a qualitative or quantitative fit-test within the past year for the brand, model and size respirator they plan to don.

If worn, respirators will be cleaned after each use with respirator wipe pads and will be stored in plastic bags after cleaning. Respirators will be thoroughly cleaned using disinfectant material within one week following any respirator use. Refer to the cleaning instructions provided with the respirator or specified by Appendix B-2 to the OSHA regulations at 29 CFR 1910.134.

7.3 Other Safety Equipment

The following additional safety items will be available at the site:

- Portable, hand-held eyewash bottles
- First aid kit
- Type A-B-C fire extinguisher
- Portable phones

8.0 Site Control

To prevent both exposure of unprotected personnel and migration of contamination due to tracking by personnel or equipment, hazardous work areas will be clearly identified and decontamination procedures will be required for personnel and equipment leaving those areas.

8.1 Designation of Zones

AECOM designates work areas or zones as suggested in the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, November 1985. They recommend that the areas surrounding each of the work areas to be divided into three zones:

- Exclusion or "Hot" Zone
- Contamination Reduction Zone
- Support Zone

8.1.1 Exclusion Zone

An exclusion zone will be established around the drilling areas. The perimeter of the exclusion zone will be marked with caution tape or indicated by traffic cones so that employees, visitors, and client or host employer personnel are aware of the work being conducted.

All AECOM and contractor personnel entering these work areas must wear the prescribed level of protective equipment.

8.1.2 Contamination Reduction Zone

A decontamination zone will be established adjacent to each work area. Personnel will remove contaminated gloves and other disposable items in this area and place them in a plastic bag until they can be properly disposed of.

8.1.3 Support Zone

At this site the support zone will include the area outside of the exclusion zone.

8.1.4 Site Access Control

The public will be restricted from the project site and monitoring well locations (during monitoring) by fences, barricade tape, traffic cones, and/or signs.

8.1.5 Parking and Staging Areas

Parking will be restricted to areas that have been cleared of tall grass and combustible material. Vehicles parked on the public streets will be marked with cones both in front of and behind the vehicle.

8.1.6 Pedestrian Walkways

Pathways within the work areas will be kept clear of obstructions. Public pathways will be clearly marked to provide access to the business onsite and protect the public from the hazards of the project.

8.2 General Site Safety Practices

The following measures are designed to augment the specific health and safety guidelines provided in this plan.

- The "buddy system" will be used at all times by all field personnel. No one is to perform field work alone. Standby team member must be intimately familiar with the procedures for initiating an emergency response.
- Eating, chewing gum or tobacco, smoking or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in the immediate work area and the decontamination zone. Water and Ice may be consumed in all areas to prevent heat stress but precautions must be taken to prevent contamination of the water and ice.
- Smoking is prohibited in all work areas. Matches and lighters are not allowed in these areas.
- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking or any other activities.
- Beards or other facial hair that interfere with respirator fit are prohibited.
- The use of alcohol or illicit drugs is prohibited during the conduct of field operations.
- All equipment must be decontaminated or properly discarded before leaving the site in accordance with the project work plan.
- Parking and pedestrian areas will be established and communicated to all workers.

9.0 Decontamination

9.1 Personal Decontamination

Proper decontamination is required of all personnel before leaving the site. Decontamination will occur within the contamination reduction zone.

Regardless of the type of decontamination system required, a container of potable water and liquid soap should be made available so employees can wash their hands and face before leaving the site for lunch or for the day.

9.2 PPE Decontamination

Disposable PPE, such as Tyvek coveralls, gloves, etc. will be removed in the decon zone and placed in garbage bags. Final disposal of contaminated PPE will be in accordance with the work plan.

If worn, respirators will be cleaned after each use with respirator wipe pads and will be stored upright in plastic bags. Respirators will be thoroughly cleaned using disinfectant material within one week following any respirator use. Refer to the cleaning instructions provided with the respirator or specified by Appendix B-2 to the OSHA regulations at 29 CFR 1910.134.

9.3 Equipment Decontamination

Equipment will be decontaminated prior to being moved to other locations. Decontamination procedures will be specified by the Project Manager.

10.0 Medical Monitoring and Training Requirements

Each worker subject to this HASP shall have copies of documentation that the requirements for training, medical surveillance, and respirator use are current. Copies of these documents shall be made available to AECOM or AECOM's client upon request.

10.1 Medical Monitoring

All personnel performing activities covered by this HASP must be active participants in a medical monitoring program that complies with 29 CFR 1910.120(f). Each individual must have completed an annual surveillance examination and/or an initial baseline examination within the last year prior to performing any work on the site covered by this HASP.

10.2 Health and Safety Training

10.2.1 HAZWOPER

All personnel performing activities covered by this HASP must have completed the appropriate training requirements specified in 29 CFR 1910.120 (e). Each individual must have completed an annual 8-hour refresher training course and/or initial 40-hour training course within the last year prior to performing any work on the sites covered by this HASP.

10.2.2 Pre-Entry Briefing

Prior to the commencement of on-site activities, a pre-entry briefing will be conducted by the SSO to review the specific requirements of this HASP. Attendance of the pre-entry meeting is mandatory for all personnel covered by this HASP and must be documented on the attendance form provided in Attachment C. HASP sign-off sheets should also be collected at the time of the pre-entry briefing. All documentation should be maintained in the project file.

The pre-entry briefing must be completed for each new employee before they begin work at the site. Short safety refresher meetings will be conducted, as needed, throughout the duration of the project.

11.0 Emergency Response

OSHA defines emergency response as any "response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual-aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result in an uncontrolled release of a hazardous substance." According to AECOM policy, AECOM personnel shall not participate in any emergency response where there are potential safety or health hazards (i.e., fire, explosion, or chemical exposure). AECOM response actions will be limited to evacuation and medical/first aid as described within this section below. As such this section is written to comply with the requirements of 29 CFR 1910.38 (a).

The basic elements of an emergency evacuation plan include:

- employee training,
- alarm systems,
- escape routes,
- escape procedures,
- critical operations or equipment,
- rescue and medical duty assignments,
- designation of responsible parties,
- emergency reporting procedures and
- methods to account for all employees after evacuation.

11.1 Spill Response

Employees are only authorized to respond to incidental spills and releases of hazardous substances. The following criteria must be met for a spill to be considered incidental with the employee having the ability to respond to the spill:

- Quantity of spilled material is minimal enough where additional, third party assistance is not needed to manage the spill
- Material is not immediately threatening to impact an open water way
- The conditions of the spill do not present a hazardous condition that is immediately dangerous to life and health (IDLH)
- The employee responding has:
 - received training on proper spill response techniques relative to the spilled material
 - full knowledge of what has been spilled and the proper clean up techniques to be used
 - the means to protect themselves against exposure to harmful conditions caused by the spill including the necessary PPE
 - the means to containerize and dispose of the spilled material properly

Employees may be equipped with the following materials, assembled into a spill response kit, to manage incidental workplace spills:

- Absorbent pads or media, i.e. speedy-dry, kitty litter
- Broom and dust pan to clean up spent granular spill control media or impacted earth
- Shovel to clean up impacted earth or create a dam or dyke to prevent the spill area from increasing
- Disposal drums and over-pack drums
- Appropriate waste identification labels
- Appropriate PPE

If a spill is not considered incidental, then additional assistance will be sought to aid in clean-up. The responding employee shall contact the Project Manager and provide initial notification of the release. The Project Manager will then notify the client representative and determine a suitable course of action. Chem-trec may be contacted to provide additional support in responding to a spill. Consideration will need to be given to whether or not the spill is deemed to be a reportable quantity (RQ) by the EPA, if the National Spill Response Center needs to be contacted due to surface water impact, and if local, state or federal agencies need to be contacted to provide information related to public health threats and environmental impact.

All spills must be reported to the AECOM PM and RHSM, with the PM providing notification to the client representative, no matter how small the spill is. After initial response actions have been completed an incident investigation will be performed to determine the root causes of the incident and corrective actions, and lessons learned shall be shared to prevent future reoccurrence. Once the response is complete, the responding employee will also conduct an inventory of supplies used during the response effort and re-stock any used response equipment that could not be decontaminated and reused.

11.2 Employee Training

Employees must be instructed in the site-specific aspects of emergency evacuation. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed.

11.3 Alarm System/Emergency Signals

An emergency communication system must be in effect at all sites. The simplest and most and effective emergency communication system in many situations will be direct verbal communications. Each site must be assessed at the time of initial site activity and periodically as the work progresses. Verbal communications must be supplemented anytime voices can not be clearly perceived above ambient noise levels (i.e., noise from heavy equipment; drilling rigs, backhoes, etc.) and anytime a clear line-of-sight can not be easily maintained amongst all AECOM personnel because of distance, terrain or other obstructions.

Verbal communications will be adequate to warn employees of hazards associated with the immediate work area. The property is occupied but AECOM may not have access to facility phones. Therefore, AECOM will bring a portable phone to the site to ensure that communications with local emergency responders is maintained, when necessary.

11.4 Escape Routes and Procedures

The escape route from the site and an emergency muster point will be determined and provided to all workers during the project mobilization.

Prior to mobilizing to a new project area, the Site Safety Officer or his designee will confirm that the escape routes are clear and lead to a safe area.

11.5 Employee Accounting Method

The SSO is responsible for identifying all AECOM personnel on-site at all times. AECOM and its subcontract employees will notify the SSO when they enter and leave the site. The SSO will account for all AECOM and its subcontract employees following an evacuation.

11.6 Injuries and Illnesses

The phone numbers of the police and fire departments, ambulance service, local hospital, and AECOM representatives are provided in the emergency reference sheet on page 1. This sheet will be posted in the site vehicle.

11.6.1 First Aid

Minor injuries will be treated on site using materials from the first aid kit or other local sources. All cuts and abrasions will be cleaned with potable water and a clean dressing applied. The injured employee will be evaluated at the end of the work day and the following day when the employee arrives at the project site to determine whether the wound has started the healing process. The wound will be protected from contamination during the project activities.

11.6.2 Professional Treatment

In the event an injury or illness requires more than first aid treatment, the SSO will accompany the injured person to the medical facility and will remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the on-site project manager and the RHSM.

If the injured employee can be moved from the accident area, he or she will be brought to the CRZ where their PPE will be removed. If the person is suffering from a back or neck injury the person will not be moved and the requirements for decontamination do not apply. The SSO must familiarize the responding emergency personnel about the nature of the site and the injury. If the responder feels that the PPE can be cut away from the injured person's body, this will be done on-site. If this not feasible, decontamination will be performed after the injured person has been stabilized.

11.7 Designation of responsible parties

The SSO is responsible for initiating emergency response. In the event the SSO can not fulfill this duty, the alternate SSO will take charge.

11.8 Emergency Response Drills

For projects with durations of greater than four days on site, the SSO will initiate an evacuation drill during the first five days and shall repeat the drills at least quarterly. Deficiencies noted during the drills will be documented as a Near Loss, a Root Cause Analysis conducted and corrective actions initiated.

A table-top run through of the evacuations procedures from the manufacturing site will be conducted the first day on the site and reviewed with all workers arriving on site after that date.

Emergency Response drills and subsequent personnel briefings on evacuation procedures will be documented in the safety briefing agenda or briefing notes.

11.9 Incident Reporting and Investigation

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage requires an Incident investigation and report. The investigation should be conducted as soon as emergency conditions are under control. The purpose of the investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided. An AECOM Incident investigation form is presented in Attachment D of this HASP. The injured AECOM employee's supervisor, the AECOM Project Manager, and the RHSM should be notified immediately of the injury.

If a subcontractor employee is injured, they are required to notify the AECOM SSO. Once the incident is under control, the subcontractor will submit a copy of their company's Incident investigation report to the AECOM SSO.

Attachment A - Health and Safety Plan Review Form

Health and Safety Plan Acceptance Form

**Operations Maintenance and Monitoring
Reilly Industries, Inc. NPL Site
St. Louis Park, Minnesota**

I have reviewed a copy of the Health and Safety Plan prepared for the above-referenced site and activities. I have read and understood its contents and I agree that I will abide by its requirements.

Name: _____

Signature: _____

Date: _____

Representing: _____

Attachment B - Job Safety Analysis

Attachment C - Pre-Entry Briefing Attendance Form

Attachment D - Supervisor's Incident Investigation Report

Supervisor's Incident Investigation Report

Injured Employee _____ Job Title _____

Home Office _____ Division/Department _____

Date/Time of Incident _____

Location of Incident _____

Witnesses to the Incident _____

Injury Incurred? _____ Nature of Injury _____

Engaged in What Task When Injured? _____

Will Lost Time Occur? _____ How Long? _____ Date Lost Time Began _____

Were Other Persons Involved/Injured? _____

How Did the Incident Occur? _____

What Could Be Done to Prevent Recurrence of the Incident? _____

What Actions Have You Taken Thus Far to Prevent Recurrence? _____

Supervisor's Signature _____ Title _____ Date _____

Reviewer's Signature _____ Title _____ Date _____

Note: If the space provided on this form is insufficient, provide additional information on a separate page and attach. The completed Incident investigation report must be submitted to the Regional Health and Safety Manager within two days of the occurrence of the Incident.

Attachment E - Material Safety Data Sheets

.....Alconox

**SPI Supplies Division
Structure Probe, Inc.**

P.O. Box 656 West Chester, PA 19381-0656 USA

Phone: 1-(610)-436-5400 Fax: 1-(610)-436-5755

E-mail: spi3spi@2spi.com

WWW: <http://www.2spi.com>

Manufacturer's CAGE: 1P573



Material Safety Data Sheet

SPI #01200-AB and #01200A-AB Alconox® Powdered Detergent

Section 1: Identification

Date Effective..... November 14, 2005
(most recent revision)

Chemical Name/Synonyms... On Label: Alconox®

Chemical Family..... Anionic powdered detergent

Emergencies
Contacting CHEMTREC:

24 Hour Emergency Use Only #'s...
Worldwide phone: 1-(703)-527-3887
Worldwide FAX: 1-(703)-741-6090
Toll-free phone: 1-(800)-424-9300 USA only

Product or Trade Name.... SPI #01200-AB and #01200A-AB
Alconox® Powdered Detergent

CAS #..... Not applicable

Chemical Formula..... Not applicable



Section 2 Composition

Component Name	CAS #	OSHA	OSHA	ACGIH	ACGIH
----------------	-------	------	------	-------	-------

No hazardous ingredients in Alconox Powdered Detergent as defined by the OSHA Standard and Hazardous Substance List 29 CFR 1910 Subpart Z.

Hazardous Material Information System USA	Health	0	National Fire Protection Association USA	
	Fire Hazard	0		
	Reactivity	0		
	Personal Protection			

NFPA (National Fire Protection Association) Rating (Scale 0-4):
 HEALTH=0 FLAMMABILITY=0 REACTIVITY=0 OTHER=0 Not known

Section 3: Hazard Identification

Routes of entry

Inhalation?	Yes
Skin?	No
Ingestion?	Yes

Health Hazards (Acute and chronic):

Inhalation of powder may prove locally irritating to mucous membranes.
 Ingestion may cause discomfort and/or diarrhea. Eye contact may prove irritating.

Carcinogenicity:

NTP?	No
IARC Monographs?	No
OSHA Regulated?	No

Section 4: First Aid Measures

Signs and Symptoms of Exposure:

Exposure may irritate mucous membranes. May cause sneezing.

Medical conditions generally aggravated by exposure:

Not established. Unnecessary exposure to this product or any industrial chemical should be avoided. Respiratory conditions may be aggravated by powder if air borne.

Emergency and First Aid Procedures:

Eyes: Immediately flush eyes with copious amounts of water for minimum 15 minutes. Call physician.

Skin: Flush with plenty of water.

Ingestion: Drink large quantities of water or milk. Do not induce vomiting. If vomiting occurs re-administer fluids. See a physician for discomfort.

Section 5: Fire Fighting Measures

NFPA Rating: Not known

Extinguishing Media

Suitable/Not suitable:

SMALL FIRE: Use DRY chemical powder, water, foam, carbon dioxide

LARGE FIRE: Use extinguishing media suitable for the surrounding materials.

Special firefighting procedures:

Self-contained positive pressure breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.

Unusual Fire/Explosion Hazards: None

Hazardous thermal decomposition products: None known.

Protection of fire fighters: No special measures are required.

Flammable Limits:

LEL: No data

UEL: No data

Section 6: Accidental Release Measures

Personal precautions: No special precautions

Environmental Precautions and Clean Up Methods:

HASP – OM&M
Reilly Industries, Inc NPL Site
St. Louis Park, Minnesota

Material foams profusely. Recover as much as possible and flush remainder to sewer. Material is biodegradable.

Section 7: Handling and Storage

Material should be stored in a dry area to prevent caking.

Section 8: Exposure Controls and Personal Protection

Engineering controls: Normal ventilation is normally required when handling or using this product. Avoid conditions that could produce dusting.

Personal Protective Equipment

Respiratory system: Dust mask recommended but not required.

Skin and body: Laboratory coat recommended but not required.

Hands: Impervious gloves recommended

Eyes: Goggles are recommended, especially when handling solutions irrespective of what they might be.

Other: Wash hands before eating, drinking, or smoking.

Section 9: Physical and Chemical Properties

Physical State and Appearance: White powder interspersed with cream colored flakes.

Odor: None

Boiling Point: Not applicable

Melting Point: Not applicable

Density (water = 1): Not applicable

Solubility: Appreciable, to 10% at ambient conditions.

Octanol/water partition coefficient: Not available

pH: Not known

Flash Point: None

Flammability: Non-flammable

Autoignition temperature: Not applicable

Section 10: Stability and Reactivity

Chemical Stability: The product is stable

Hazardous polymerization: Will not occur

Conditions to Avoid: None

Hazardous Products of Deposition: May release CO₂ on burning.

Reactions with Air and Water:

Does not react with air, water or other common materials.

Section 11: Toxicological Information

Summary: Not considered to be toxic to humans or animals.

Skin Effects: Can be locally irritating

Eye Irritation: Can be irritating to the eyes

Inhalation: Dust can be irritating to mucous membranes

Sensitization: Not known

Chronic toxicity: There is no known effect from the chronic exposure to this product.

Section 12: Ecological Information

Exotoxicity: Not know but it is expected to be low because the material is biodegradable.

Environmental Fate: It is biodegradable.

Bioaccumulation: Not expected to occur (because the material is biodegradable).

Section 13: Disposal Considerations

This material is NOT classified as a hazardous material by RCRA. Use only licensed transporters and permitted disposal facilities and conform to all laws.

Recycle to process, if possible.

Germany water class: VCI WGK: No products were found.

Methods of disposal; waste of residues; contaminated packaging:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

Proper Shipping Name: Non-Regulated, No dangerous cargo

DOT Hazard Class: Non-Regulated, No dangerous cargo

UN/NA ID: Non-Regulated, No dangerous cargo

Packing Group: Not Applicable

Labels: Not Regulated

Marine Pollutant: No

NAER Guidebook: Not Regulated

DOT Status: Not Regulated

Land-Road/Railway:
ADR/RID Class: No dangerous cargo

Sea:
IMDG Class: No dangerous cargo

Air:
IATA-DGR Class: No dangerous cargo

Section 15: Regulatory Information

TSCA: All components of this product are listed on the TSCA 8(b) inventory. If identified components of this product are listed under the TSCA 12(b) Export Notification Rule, they will be listed below.

TSCA 12(b) Component	Listed under TSCA Section
----------------------	---------------------------

SARA Title 3: Section 313 Information/Emissions Reporting (**40 CFR 372**):

Component	Reporting Threshold
-----------	---------------------

SARA-Section 311/312:

No components present in this product are subject to the reporting requirements of this statute.

CERCLA Hazardous Substances and their Reportable Quantities:

Component	Reportable Quantity
-----------	---------------------

EU Regulations: Risk Phrases: This product is not classified according to the EU regulations.

Safety Phrases: Not applicable

Contains: Not applicable

California Prop. 65:

Proposition 65 requires manufacturers or distributors of consumer products into the State of California to provide a warning statement if the product contains ingredients for which the State has found to cause cancer, birth defects or other reproductive harm. If this product contains an ingredient listed by the State of California to cause cancer or reproductive toxicity, it will be listed below:

None found

Section 16: Other Information**Disclaimer of Liability:**

Caution! Do not use SPI Supplies products or materials in applications involving implantation within the body; direct or indirect contact with the blood pathway; contact with bone, tissue, tissue fluid, or blood; or prolonged contact with mucous membranes. Products offered by SPI Supplies are not designed or manufactured for use in implantation in the human body or in contact with internal body fluids or tissues. SPI Supplies will not

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Thursday February 22, 2007

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.....Isobutylene Calibration Gas



MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

PART I What is the material and what do I need to know in an emergency?

1. PRODUCT IDENTIFICATION

CHEMICAL NAME; CLASS: **NON-FLAMMABLE GAS MIXTURE**

PRODUCT USE: Document Number: 002103
For general analytical/synthetic chemical uses.

SUPPLIER/MANUFACTURER'S NAME: AIRGAS INC.

ADDRESS: 259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283

BUSINESS PHONE: 1-610-687-5253

EMERGENCY PHONE: 1-800-949-7937

International: 1-423-479-0293

DATE OF PREPARATION: April 22, 2001

2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	mole %	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA		NIOSH	OTHER
			TLV ppm	STEL ppm	PEL ppm	STEL ppm	IDLH ppm	ppm
Isobutylene	115-11-7	1 ppm - 1.7%	There are no specific exposure limits for Isobutylene. Isobutylene is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Air	25635-88-5	Balance	There are no specific exposure limits applicable to Air.					
Air is a mixture of gases. The primary components of air, and the approximate concentration of each component, are listed below								
Nitrogen	7727-37-9	79%	There are no specific exposure limits for Nitrogen. Nitrogen is a simple asphyxiant (SA). Oxygen levels should be maintained above 19.5%.					
Oxygen	7782-44-7	21%	There are no specific exposure limits for Oxygen					

NE = Not Established. See Section 16 for Definitions of Terms Used.

NOTE (1): ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1998 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a colorless, odorless, non-flammable gas. The main health hazards associated with releases of this gas are related to the high pressure within the cylinder. Air, the main component of this product, is generally considered non-flammable, however, Air will support combustion. The flammable component of this gas mixture is below the LEL. A cylinder rupture hazard exists when this product, which is under pressure, is subjected to heat or flames. Emergency responders must wear personal protective equipment appropriate for the situation to which they are responding.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: The most significant route of over-exposure for air is by inhalation at elevated or reduced pressure.

INHALATION: This product is non-toxic. Air, the main component of this product, is necessary for life.

OTHER POTENTIAL HEALTH EFFECTS: Contact with rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**. Over-exposure to this product may cause the following health effects:

ACUTE: The most significant hazards associated with compressed air is the pressure hazard. Contact with rapidly expanding gases (which are released under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

CHRONIC: There are currently no known adverse health effects associated with chronic exposure to this gas.

TARGET ORGANS: ACUTE: Respiratory system under ambient low pressure conditions. Central nervous system under ambient high pressure conditions. CHRONIC: None expected.

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS PRODUCT WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. At a minimum, Self-Contained Breathing Apparatus equipment should be worn.

Victim(s) must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or other health professional with victim(s). Remove victim(s) to fresh air, as quickly as possible. In case of eye contact which leads to irritation, immediately flush eyes with copious amounts of water for at least 15 minutes. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Only trained personnel should administer supplemental oxygen.

In case of frostbite, place the frostbitten part in warm water. DO NOT USE HOT WATER. If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area in the armpit. Encourage victim to gently exercise the affected part while being warmed. Seek immediate medical attention.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Acute or chronic respiratory conditions, as well as disorders involving the "Target Organs", as listed in Section 3 (Hazard Information), may be aggravated by overexposure to the components of this product.

RECOMMENDATIONS TO PHYSICIANS: Administer oxygen as soon as possible, following exposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

5. FIRE-FIGHTING MEASURES (Continued)

FIRE EXTINGUISHING MATERIALS: Non-flammable gas. Use extinguishing media appropriate for surrounding fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: When involved in a fire, this material may decompose and produce toxic gases including carbon monoxide and carbon dioxide. Additionally, when involved in fire, the cylinders may rupture.

Explosion Sensitivity to Mechanical Impact: Not Sensitive.

Explosion Sensitivity to Static Discharge: Not Sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move fire-exposed cylinders from area, if it can be done without risk to fire-fighters. Withdraw immediately in case of rising sounds from venting pressure relief devices or any discoloration of tanks or cylinders due to a fire.

6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a release, clear the affected area, protect people, and respond with trained personnel. Minimum Personal Protective Equipment should be **Level D: safety glasses, and mechanically-resistant gloves. Level B, which includes the use of Self-Contained Breathing Apparatus, should be worn when oxygen levels are below 19.5% or are unknown.** Locate and seal the source of the leaking gas. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in place or remove it to a safe area and allow the gas to be released there.

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: Do not eat or drink while handling chemicals.

STORAGE AND HANDLING PRACTICES: Cylinders should be stored in dry, well-ventilated areas away from sources of heat. Compressed gases can present significant safety hazards. Store containers away from heavily trafficked areas and emergency exits.

SPECIAL PRECAUTIONS FOR HANDLING GAS CYLINDERS: Protect cylinders against physical damage. Store in cool, dry, well-ventilated, fireproof area, away from flammable or combustible materials and corrosive atmospheres. Store away from heat and ignition sources and out of direct sunlight. Do not store near elevators, corridors or loading docks. Do not allow area where cylinders are stored to exceed 52°C (125°F). Isolate from incompatible materials including flammable materials (see Section 10, Stability and Reactivity), which can burn violently. Use only storage containers and equipment (pipes, valves, fittings to relieve pressure, etc.) designed for the storage of Air. Do not store containers where they can come into contact with moisture. Cylinders should be stored upright and be firmly secured to prevent falling or being knocked over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Never tamper with pressure relief devices in valves and cylinders. The following rules are applicable to situations in which cylinders are being used:

Before Use: Move cylinders with a suitable hand-truck. Do not drag, slide or roll cylinders. Do not drop cylinders or permit them to strike each other. Secure cylinders firmly. Leave the valve protection cap in-place until cylinder is ready for use.

During Use: Use designated CGA fittings and other support equipment. Do not use adapters. Do not heat cylinder by any means to increase the discharge rate of the product from the cylinder. Use check valve or trap in discharge line to prevent hazardous backflow into the cylinder. Do not use oils or grease on gas-handling fittings or equipment.

After Use: Close main cylinder valve. Replace valve protection cap. Mark empty cylinders "EMPTY".

NOTE: Use only DOT or ASME code containers. Earth-ground and bond all lines and equipment associated with this product. Close valve after each use and when empty. Cylinders must not be recharged except by or with the consent of owner. For additional information refer to the Compressed Gas Association Pamphlet P-1, *Safe Handling of Compressed Gases in Containers*. Additionally, refer to CGA Bulletin SB-2 "Oxygen Deficient Atmospheres".

7. HANDLING and STORAGE (Continued)

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged out safely. Purge gas handling equipment with inert gas (i.e. nitrogen) before attempting repairs. Always use product in areas where adequate ventilation is provided.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation.

RESPIRATORY PROTECTION: Maintain Oxygen levels above 19.5% in the workplace. If respiratory protection is needed, use only protection authorized in the U.S. Federal OSHA Standard (29 CFR 1910.134), applicable U.S. State regulations, or the Canadian CSA Standard Z94.4-93 and applicable standards of Canadian Provinces. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Splash goggles, face-shields or safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133, or Canadian Standards.

HAND PROTECTION: Wear mechanically-resistant gloves when handling cylinders of this product. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate for task. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR.

9. PHYSICAL and CHEMICAL PROPERTIES

The following information is for **Air**, the main component of this product, unless otherwise stated:

RELATIVE VAPOR DENSITY: 1	EVAPORATION RATE (nBuAc = 1): Not applicable.
SPECIFIC GRAVITY: Not applicable.	FREEZING POINT: -216.2°C (-357.2°F)
SOLUBILITY IN WATER: 1.49% (v/v)	BOILING POINT @ 1 atmos: -194.3°C(-317.8°F)
VAPOR PRESSURE, mmHg @ 20°C:	pH: Not applicable.
EXPANSION RATIO: Not applicable.	VAPOR PRESSURE: Not applicable.
SPECIFIC VOLUME: 13.3 ft ³ /lb; (0.833 m ³ /kg)	ODOR THRESHOLD: Not applicable.
COEFFICIENT WATER/OIL DISTRIBUTION:	Not applicable.

The following information is pertinent to this gas mixture:

APPEARANCE, ODOR AND COLOR: This product is a colorless, odorless gas.

HOW TO DETECT THIS SUBSTANCE (warning properties): There are no distinctive properties to this product. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

10. STABILITY and REACTIVITY

STABILITY: Normally stable.

DECOMPOSITION PRODUCTS: None known.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE. Air (the main component of this product) is not compatible with fuels, in that air will support combustion. The Isobutylene component of this mixture is incompatible with Strong oxidizers (e.g., chlorine, bromine pentafluoride, oxygen, oxygen difluoride, and nitrogen trifluoride).

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials and exposure to heat, sparks and other sources of ignition. Cylinders exposed to high temperatures or direct flame can rupture or burst.

PART III *How can I prevent hazardous situations from occurring?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The following toxicology data are for the components of this gas mixture present at a level greater than 1 mole %:

ISOBUTYLENE:

LC50 (Inhalation-Rat) 620 gm/m³/4 hours LC50 (Inhalation-Mouse) 415 gm/m³/2 hours

SUSPECTED CANCER AGENT: No component of this gas mixture is found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC, and therefore is not considered to be, nor suspected to be, cancer causing agents by these agencies.

IRRITANCY OF PRODUCT: Contact with rapidly expanding gases can cause frostbite and damage to exposed skin and eyes.

SENSITIZATION OF PRODUCT: No component of this product is a skin or respiratory sensitizer.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: This product is not reported to cause mutagenic effects in humans.

Embryotoxicity: This product is not reported to cause embryotoxic effects in humans.

Teratogenicity: This product is not reported to cause teratogenic effects in humans.

Reproductive Toxicity: This product is not reported to cause adverse reproductive effects in humans.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generation lines. An embryotoxin is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with

the reproductive process.

BIOLOGICAL EXPOSURE INDICES: Biological Exposure Indices (BEIs) have been determined for the components of this product are as follows:

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY: This gas will be dissipated rapidly in well-ventilated areas.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No adverse effect is anticipated to occur to plant-life, except for frost produced in the presence of rapidly expanding gases.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence of an adverse effect of this product on aquatic life is currently available.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Product removed from cylinder must be disposed of in accordance with appropriate U.S. Federal, State and local regulations or with regulations of Canada and its Provinces. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

14. TRANSPORTATION INFORMATION

THIS GAS MIXTURE IS HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Compressed gases, n.o.s. (Air, Isobutylene)
 HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Compressed Gas)
 UN IDENTIFICATION NUMBER: UN 1956
 PACKING GROUP: Not Applicable
 DOT LABEL(S) REQUIRED: Compressed Gas
 NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2000): 126
 TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This gas mixture is considered as dangerous goods, per regulations of Transport Canada. Use the above information for the preparation of Canadian Shipments.

15. REGULATORY INFORMATION

ADDITIONAL U.S. REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this gas mixture are not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this material. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Not applicable.

U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

U.S. STATE REGULATORY INFORMATION: The components of this gas mixture are covered under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: None.
California - Permissible Exposure Limits for Chemical Contaminants: None.
Florida - Substance List: Isobutylene. **Illinois - Toxic Substance List:** None.
Kansas - Section 302/313 List: None.
Minnesota - List of Hazardous Substances: Isobutylene.
Massachusetts - Substance List: None.
Missouri - Employer Information/Toxic Substance List: None.
New Jersey - Right to Know Hazardous Substance List: Isobutylene.
North Dakota - List of Hazardous Chemicals, Reportable Quantities: None.
Pennsylvania - Hazardous Substance List: Isobutylene.
Rhode Island - Hazardous Substance List: None.
Texas - Hazardous Substance List: None.
West Virginia - Hazardous Substance List: None.
Wisconsin - Toxic and Hazardous Substances: None.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this product is on the California Proposition 65 Lists.

LABELING: CAUTION: HIGH PRESSURE GAS.
MAY ACCELERATE COMBUSTION.
 Keep oil and grease away.
 Use equipment rated for cylinder pressure.

Close valve after each use and when empty.
Use in accordance with the Material Safety Data Sheet.

FIRST-AID: **IF INHALED**, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
IN CASE OF FROSTBITE, obtain immediate medical attention.
DO NOT REMOVE THIS PRODUCT LABEL.

ADDITIONAL CANADIAN REGULATIONS:

CANADIAN DSL INVENTORY: The components of this product are listed on the DSL Inventory.

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this product are not on the CEPA Priorities Substances Lists.

CANADIAN WHMIS SYMBOLS: **Class A**: Compressed Gases

16. OTHER INFORMATION

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
858/565-0302

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. AirGas, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, AirGas, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits. **TLV** - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour Time Weighted Average (**TWA**), the 15-minute Short Term Exposure Limit, and the instantaneous Ceiling Level (**C**). Skin absorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration. **PEL** - Permissible Exposure Limit - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.

IDLH - Immediately Dangerous to Life and Health - This level represents a concentration from which one can escape within 30- minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **Recommended Exposure Levels (RELs)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

HAZARD RATINGS:

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (slight acute or chronic exposure hazard); **2** (moderate acute or significant chronic exposure hazard); **3** (severe acute exposure hazard; onetime overexposure can result in permanent injury and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93 C [100-200 F]); **3** (Class IB and IC flammable liquids with flash points below 38 C [100 F]); **4** (Class IA flammable liquids with flash points below 23 C [73 F] and boiling points below 38 C [100 F]). Reactivity Hazard: **0** (normally stable); **1** (material that can become unstable at elevated temperatures or which can react slightly with water); **2** (materials that are unstable but do not detonate or which can react violently with water); **3** (materials that can detonate when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

PERSONAL PROTECTIVE EQUIPMENT CODES: **B:** Gloves and goggles; **C:** Gloves, goggles, rubber apron (appropriate body protection); **D:** Gloves, goggles, faceshield; rubber apron (appropriate body protection); **X:** Special attention should be given to PPE Selection.

NATIONAL FIRE PROTECTION ASSOCIATION: Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (materials that on exposure under fire conditions could cause irritation or minor residual injury); **2** (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); **3** (materials that can on short exposure could cause serious temporary or residual injury); **4** (materials that under very short exposure could cause death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the National Fire Protection Association (**NFPA**). Flash Point – Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL – the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD50** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC50** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m3** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDL_o**, the lowest dose to cause a symptom and **TCL_o** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TC_o**, **LCL_o**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV. Ecological Information: EC is the effect concentration in water.

REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (**SARA**); the Canadian Domestic/Non-Domestic Substances List (**DSL/NDSL**); the U.S. Toxic Substance Control Act (**TSCA**); Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act (**CERCLA** or **Superfund**); and various state regulations.



... Gasolines, All Grades Unleaded Material Safety Data Sheet

CITGO Petroleum Corporation **MSDS No.**
P.O. Box 4689
Houston, TX 77210

UNLEAD

Revision Date 05/23/2005

IMPORTANT: Read this MSDS before handling or disposing of this product and pass this information on to employees, customers and users of this product.

Emergency Overview

Physical State Liquid.

Color Transparent, clear to **Odor** Pungent, characteristic
amber or red. gasoline.

DANGER:

Extremely flammable liquid; vapor may cause flash fire or explosion.

Vapor may travel considerable distance to source of ignition and flash back.

Use Only as a Motor Fuel. Do Not Siphon by Mouth.

Harmful or fatal if swallowed - Can enter lungs and cause damage.

High concentrations of vapor reduce oxygen available for breathing and may cause suffocation.

May be harmful if inhaled or absorbed through the skin.

Mist or vapor may irritate the eyes, mucous membranes, and respiratory tract.

Liquid contact may cause eye and skin irritation.

Overexposures may cause central nervous system (CNS) depression and target organ effects (See Section 3).

Harmful or fatal if swallowed - Can enter lung and cause

Hazard Rankings	
HMIS NFPA	
Health Hazard	* 2 1
Fire Hazard	3 3
Reactivity	0 0
* = Chronic Health Hazard	

Protective Equipment

Minimum Recommended See Section 8 for Details



damage.

Inhalation overexposure can increase the heart's susceptibility to arrhythmias (irregular beats).

Contains Benzene - Cancer Hazard.

Long term exposure to gasoline vapor has caused cancer in laboratory animals.

Avoid Spills. Spills may present both a physical and an environmental hazard.

SECTION! PRODUCT IDENTIFICATION

Trade Name	CITGO Gasolines, All Grades Unleaded	Technical Contact	(800) 248-4684
Product Number CAS Number	Various Mixture.	Medical Emergency	(832) 486-4700 (800) 424-9300
		CHEMTREC Emergency	
		(United States Only)	

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CITGO Gasolines, All Grades Unleaded

Product Family Synonyms Motor fuels.
 Unleaded Gasolines; Motor Gasolines; Petrol; Automobile Motor Fuels; Finished Gasolines; Gasoline, Regular Unleaded; Gasoline, Mid-grade Unleaded; Gasoline, Premium Unleaded; Reformulated Gasolines (RFG); Reformulated Motor Fuels; Oxygenated Motor Spirits; Gasoline, Regular Reformulated; Gasoline, Mid-grade Reformulated; Gasoline, Premium Reformulated.

SECTION 2. COMPOSITION

Gasoline is a complex and variable mixture that originates from finished refinery streams. These streams can contain the hydrocarbons and oxygenated chemicals (oxygenates) listed below that are regulated or are associated with certain potential health effects. The typical concentration of oxygenates in gasoline does not exceed 18% (v/v).

Component Name(s)	CAS Registry No.	Concentration (%)
Methyl tertiary-Butyl Ether (MTBE)	1634-04-4	0-15
Tertiary-Amyl Methyl Ether (TAME)	994-05-8	0-15
Ethyl tertiary Butyl Ether (ETBE)	637-92-3	0-15
Tertiary-Amyl Ethyl Ether (TAEE)	919-94-8	0-15
Diisopropyl Ether (DIPE)	108-20-3	0-15
Ethanol	64-17-5	0-10
Toluene	108-88-3	<20
Xylene, all isomers	1330-20-7	<18
n-Hexane	110-54-3	<8
Trimethylbenzenes, all isomers	25551-13-7	<5
Benzene	71-43-2	<5
Cumene		
Ethylbenzene		

Cyclohexane	98-82-8	<4
Naphthalene	100-41-4	<4
Styrene	110-82-7	<3
	91-20-3	<2
	100-42-5	<1

SECTION 3. HAZARDS IDENTIFICATION

Also see Emergency Overview and Hazard Ratings on the top of Page 1 of this MSDS. Major Route(s) of Entry Skin contact. Eye contact. Inhalation. Ingestion.

Signs and Symptoms of Acute Exposure

Inhalation

Breathing high concentrations may be harmful. Mist or vapor can irritate the throat and lungs.

Eye Contact

Breathing this material may cause central nervous system depression with symptoms including nausea, headache, dizziness, fatigue, drowsiness, or unconsciousness. Breathing high concentrations of this material, for example, in an enclosed space or by intentional abuse, can cause irregular heartbeats which can cause death.

Skin Contact

This product can cause eye irritation with short-term contact with liquid, mists or vapor. Symptoms include stinging, watering, redness, and swelling. In severe cases, permanent eye damage can result.

This material can cause skin irritation. The severity of irritation will depend on the amount of material that is applied to the skin and the speed and thoroughness that it is removed. It is likely that some components of this material are able to pass into the body through the skin and may cause similar effects as from breathing or swallowing it. If the skin is damaged, absorption increases.

Ingestion

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CITGO Gasolines, All Grades Unleaded

If swallowed, this material may irritate the mucous membranes of the mouth, throat, and esophagus. It can be readily absorbed by the stomach and intestinal tract. Symptoms include a burning sensation of the mouth and esophagus, nausea, vomiting, dizziness, staggered gait, drowsiness, loss of consciousness and delirium, as well as additional central nervous system (CNS) effects.

Chronic Health Effects Summary

Due to its light viscosity, there is a danger of aspiration into the lungs during swallowing and subsequent vomiting. Aspiration can result in severe lung damage or death. Cardiovascular effects include shallow rapid pulse with pallor (loss of color in the face) followed by flushing (redness of the face). Also, progressive CNS depression, respiratory insufficiency and ventricular fibrillation leads to death.

Intentional misuse by deliberately concentrating and inhaling gasoline can be harmful or fatal. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage ("Petrol Sniffers Encephalopathy"), delirium, seizures and sudden death are associated with repeated abuse of gasoline or naphtha.

Chronic effects of ingestion and subsequent aspiration into the lungs may include pneumatocele (lung cavity) formation and chronic

lung dysfunction.

Benzene, a component of this product, causes blood disorders and damages the bone marrow (certain types of anemia, leukemia, and lymphoma). It is also capable of causing changes in living cells' genetic material (chromosomes). Benzene is considered to be a mutagen and a cancer-causing agent (leukemogen).

Repeated and prolonged overexposure to n-hexane has been associated with peripheral nerve tissue damage. Adverse effects include numbness, tingling, pain, and loss of muscle control in the extremities, disorientation, impaired vision and reflexes, decline in motor function and paralysis.

Prolonged or repeated overexposure to toluene, a component of this product, has been associated with reproductive effects in experimental animals and in long-term chemical abuse situations. Long-term overexposure to toluene has been associated with impaired color vision. Also, long-term overexposure to toluene in occupational environments have been associated with hearing damage.

Prolonged or repeated overexposure to xylene, a component of this product, has been associated with hearing damage in laboratory animals. Repeated overexposure may cause injury to bone marrow, blood cells, kidney, and liver.

Conditions Aggravated by Exposure

Target Organs

Carcinogenic Potential

Refer to Section 11 of this MSDS for additional health-related information.

Disorders of the following organs or organ systems that may be aggravated by significant exposure to this material or its components include: Skin, Respiratory System, Liver, Kidneys, Central Nervous System (CNS), Cardiovascular System, Blood-forming system

May cause damage to the following organs: blood, kidneys, lungs, the reproductive system, liver, mucous membranes, heart, peripheral nervous system, cardiovascular system, upper respiratory tract, skin, auditory system, bone marrow, central nervous system (CNS), eye, lens or cornea.

This material may contain benzene, ethylbenzene, naphthalene or styrene at concentrations above 0.1%. Benzene is considered to be a known human carcinogen by OSHA, IARC and NTP. IARC has identified ethylbenzene, styrene, naphthalene, gasoline and gasoline engine exhaust as possibly carcinogenic to humans (Group 2B) based on laboratory animal studies.

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CITGO Gasolines, All Grades Unleaded

SECTION 4. FIRST AID MEASURES

Take proper precautions to ensure your own health and safety before attempting rescue or providing first aid. For more specific information, refer to Exposure Controls and Personal Protection in Section 8 of this MSDS.

Inhalation

Immediately move victim to fresh air. If victim is not breathing, immediately begin rescue breathing.

Eye Contact

If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). If breathing is difficult, 100 percent humidified oxygen should be administered by a qualified individual. Seek medical attention immediately. If exposed to benzene in an emergency situation, a medical evaluation should be completed at the end of the work-shift in accordance with OSHA requirements.

Skin Contact

Ingestion

Notes to Physician

Flush eyes with cool, clean, low-pressure water for at least 15 minutes. Hold eyelids apart to ensure complete irrigation of the eye and eyelid tissue. If easily accomplished, check for and remove contact lenses. If contact lenses cannot be removed, seek immediate medical attention. Do not use eye ointment. Seek medical attention.

Remove contaminated shoes and clothing. Flush affected area with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. Do not use ointments. If skin surface is not damaged, clean affected area thoroughly with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists.

OSHA Hazard Classification is indicated by an "X" in the box adjacent to the hazard title. If no "X" is present, the product does not exhibit the hazard as defined in the OSHA Hazard Communication Standard (29 CFR 1910.1200).				
OSHA Health Hazard Classification		OSHA Physical Hazard Classification		
		Combustible I Flammable X Compressed Gas I		
Irritant I x I	Sensitizer I		Explosive I I	Pyrophoric I I
Toxic I I	Highly Toxic I		Oxidizer I	Water-reactive I I
Corrosive I I	Carcinogenic I X I		Organic Peroxide I I	Unstable

Do not induce vomiting. If spontaneous vomiting is about to occur, place victim's head below knees. If victim is drowsy or unconscious, place on the left side with head down. Never give anything by mouth to a person who is not fully conscious. Do not leave victim unattended. Seek medical attention immediately.

INHALATION: Inhalation overexposure can produce toxic effects. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for upper respiratory tract inflammation, bronchitis, and pneumonitis. Administer supplemental oxygen with assisted ventilation, as required.

This material (or a component) sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

INGESTION: If ingested, this material presents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended. Consider activated charcoal and/or gastric lavage. If patient is obtunded, protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position.

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CITGO Gasolines, All Grades Unleaded

SECTIONS. FIRE FIGHTING MEASURES

NFPA Flammability Classification NFPA Class-IB flammable liquid.

Flash Point Closed cup: -43°C (-45°F). (Tagliabue [ASTM D-56])

Lower Flammable Limit AP 1.4 %

Upper Flammable Limit AP 7.6 %

Autoignition Temperature 280°C (536°F)

Hazardous Combustion Carbon dioxide, carbon monoxide, smoke, fumes, unburned hydrocarbons, aldehydes and **Products** other products of incomplete combustion.

Special Properties

Flammable Liquid! This material releases vapors at or below ambient temperatures. When mixed with air in certain proportions and exposed to an ignition source, its vapor can cause a flash fire.

Extinguishing Media

Protection of Fire Fighters

Use only with adequate ventilation. Vapors are heavier than air and may travel long distances along the ground to an ignition source and flash back. A vapor and air mixture can create an explosion hazard in confined spaces such as sewers. If container is not properly cooled, it can rupture in the heat of a fire.

SMALL FIRE: Use dry chemicals, carbon dioxide, foam, or inert gas (nitrogen). Carbon dioxide and inert gas can displace oxygen. Use caution when applying carbon dioxide or inert gas in confined spaces.

LARGE FIRE: Use foam, water fog, or water spray. Water May Be Ineffective. Water may not extinguish the fire. Water fog and spray are effective in cooling containers and adjacent structures. However, water can be used to cool the external walls of vessels to prevent excessive pressure, autoignition or explosion. **DO NOT** use a solid stream of water directly on the fire as the water may spread the fire to a larger area.

Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies. Evacuate area and fight the fire from a maximum distance or use unmanned hose holders or monitor nozzles. Cover pooling liquid with foam. Containers can build pressure if exposed to radiant heat; cool adjacent containers with flooding quantities of water until well after the fire is out. Withdraw immediately from the area if there is a rising sound from a venting safety device or discoloration of vessels, tanks, or pipelines. Be aware that burning liquid will float on water. Notify appropriate authorities of potential fire and explosion hazard if liquid enter sewers or waterways.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Take proper precautions to ensure your own health and safety before attempting spill control or clean-up. For more specific information, refer to the Emergency Overview on Page 1, Exposure Controls and Personal Protection in Section 8 and Disposal Considerations in Section 13 of this MSDS.

Flammable Liquid! Release causes an immediate fire or explosion hazard. Evacuate all non-essential personnel from immediate area and establish a "regulated zone" with site control and security. A vapor-suppressing foam may be used to reduce vapors. Eliminate all ignition sources. All equipment used when handling this material must be grounded. Stop the leak if it can be done without risk. Do not touch or walk through spilled material. Remove spillage immediately from hard, smooth walking areas. Prevent spilled material from entering waterways, sewers, basements, or confined areas. Absorb or cover with dry earth, sand, or other non-combustible material and transfer to appropriate waste containers. Use clean, non-sparking tools to collect absorbed material.

For large spills, secure the area and control access. Prevent spilled material from entering sewers, storm drains, other drainage systems, and natural waterways. Dike far ahead of a

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liquid spill to ensure complete collection. Water mist or spray may be used to reduce or disperse vapors; but, it may not prevent ignition in closed spaces. This material will float on water and its run-off may create an explosion or fire hazard. Verify that responders are properly HAZWOPER-trained and wearing appropriate respiratory equipment and fire-resistant protective clothing during cleanup operations. In an urban area, cleanup spill as soon as possible; in natural environments, cleanup on advice from specialists. Pick up free liquid for recycle and/or disposal if it can be accomplished safely with explosion-proof equipment. Collect any excess material with absorbant pads, sand, or other inert non-combustible absorbent materials. Place into appropriate waste containers for later disposal. Comply with all applicable local, state and federal laws and regulations.

SECTION 7. HANDLING AND STORAGE

HASP – OM&M

Reilly Industries, Inc NPL Site

St. Louis Park, Minnesota

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October 2009

Handling FLAMMABLE LIQUID AND VAPOR. **USE ONLY as a motor fuel.** DO NOT siphon by mouth. DO NOT use as a lighter fluid, solvent or cleaning fluid. Prior to handling or refueling, stop all engines and auxiliary equipment. Turn off all electronic equipment including cellular telephones. DO NOT leave nozzle unattended during filling or refueling a vehicle. DO NOT re-enter vehicle while refueling. Keep nozzle spout in contact with the container during the entire filling operations. A static electrical charge can accumulate when this material is flowing through pipes, nozzles or filters and when it is agitated. A static spark discharge can ignite accumulated vapors particularly during dry weather conditions. Always bond receiving containers to the fill pipe before and during loading. Always keep nozzle in contact with the container throughout the loading process. Do not fill any portable container in or on a vehicle. Special precautions, such as reduced loading rates and increased monitoring, must be observed during "switch loading" operations (i.e., loading this material in tanks or shipping compartments that previously contained middle distillates or similar products).

A spill or leak can cause an immediate fire hazard. Keep containers closed and do not handle or store near heat, sparks, or any other potential ignition sources. Do not contact with oxidizable materials. Do not breathe vapor. Use only with adequate ventilation and personal protection. Never siphon by mouth. Avoid contact with eyes, skin, and clothing. Prevent contact with food and tobacco products. Do not take internally.

When performing repairs and maintenance on contaminated equipment, keep unnecessary persons away from the area. Eliminate all potential ignition sources. Drain and purge equipment, as necessary, to remove material residues. Follow proper entry procedures, including compliance with 29 CFR 1910.146 prior to entering confined spaces such as tanks or pits. Use gloves constructed of impervious materials and protective clothing if direct contact is anticipated. Provide ventilation to maintain exposure potential below applicable exposure limits. Use appropriate respiratory protection when concentrations exceed any established occupational exposure level (See Section 8). Promptly remove contaminated clothing. Wash exposed skin thoroughly with soap and water after handling. Protect the environment from releases of this material. Prevent discharges to surface waters and groundwater. Maintain handling, transfer and storage equipment in proper working order.

Misuse of empty containers can be dangerous. Empty containers may contain material residues which can ignite with explosive force. **Cutting or welding of empty containers can cause fire, explosion, or release of toxic fumes from residues.** Do not pressurize or expose empty containers to open flame, sparks, or heat. Keep container closed and drum bungs in place. All label warnings and precautions must be observed. Return empty drums to a qualified reconditioner. Consult appropriate federal, state and local authorities before reusing, reconditioning, reclaiming, recycling, or disposing of empty containers and/or waste residues of this material.

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CITGO Gasolines, All Grades Unleaded

Storage

Store and transport in accordance with all applicable laws. Keep containers tightly closed. Store in a cool, dry, well-ventilated place. Clearly label all containers. Do not allow containers to be kept in enclosed vehicles. Keep away from all ignition sources. Ground all equipment containing this material. Containers must be able to withstand pressures that are created from changes in product temperature. Product samples and other small containers of this flammable liquid should be stored in a separate safety cabinet or room. All electrical equipment in areas where this material is stored or handled should be installed and operated in accordance with applicable regulatory requirements and the National Electrical Code.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Engineering Controls

Provide ventilation or other engineering controls to keep the airborne concentrations of vapor or mists below the applicable workplace exposure limits indicated below. All electrical equipment should comply with the National Electric Code. An emergency eye wash station and safety shower should be located near the work-station.

Personal Protective Equipment

Personal protective equipment should be selected based upon the conditions under which this

Ethylbenzene
 Cyclohexane
 Naphthalene
 Styrene

STEL: 150 ppm 15 minute(s). **OSHA (United States).**
 TWA: 100 ppm 8 hour(s). **ACGIH TLV (United States).**
 TWA: 20 ppm 8 hour(s). **ACGIH (United States).**
 TWA: 50 ppm 8 hour(s). **ACGIH TLV (United States).**
 TWA: 5 ppm 8 hour(s). **ACGIH (United States).** **Skin**
 TWA: 50 ppm 8 hour(s). **OSHA (United States).**
 TWA: 500 ppm 8 hour(s). **ACGIH (United States).**
 TWA: 50 ppm 8 hour(s). **OSHA (United States).** **Skin**
 TWA: 50 ppm 8 hour(s). **ACGIH (United States).**
 TWA: 25 ppm 8 hour(s). **ACGIH (United States).** **Skin**
 TWA: 0.5 ppm 8 hour(s).
 STEL: 2.5 ppm 15minute(s). **OSHA (United States).** **Skin Notes: See Table Z-2 for exclusions in 20 CFR 1910.1028 to the PEL.**
 TWA: 1 ppm 8 hour(s).
 STEL: 5 ppm 15minute(s). **ACGIH (United States).**
 TWA: 100 ppm 8 hour(s).
 STEL: 125 ppm 15 minute(s). **OSHA (United States).**
 TWA: 100 ppm 8 hour(s). **ACGIH (United States).**
 TWA: 100 ppm 8 hour(s). **OSHA (United States).**
 TWA: 300 ppm 8 hour(s). **ACGIH (United States).** **Skin**
 TWA: 10 ppm 8 hour(s).
 STEL: 15 ppm 15 minute(s). **OSHA (United States).**
 TWA: 10 ppm 8 hour(s). **ACGIH (United States).**
 TWA: 20 ppm 8 hour(s).
 STEL: 40 ppm 15minute(s). **OSHA (United States).**
 TWA: 100 ppm 8 hour(s).
 STEL: 200 ppm 15minute(s).
 PEAK: 600 ppm

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CITGO Gasolines, All Grades Unleaded

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES (TYPICAL)

Physical State	Liquid.	nsparent, clear to amber or red.	Odor	Pungent, characteristic gasoline.
Specific Gravity	0.72-0.77 (Water = 1)	pH Not applicable	Vapor Density	3 to 4 (Air= 1) Not available.
Boiling Range	38 to 204°C (100 to 400°F)		Melting/Freezing Point	720 to 770 g/l VOC (w/v) <1
Vapor Pressure	220 to 450 mm Hg at 20°C (68°F) or 6 to 15 Reid-psia at 37.8°C (100°F).		Volatility	
Solubility in Water	Hydrocarbon components of gasoline are slightly soluble in water. Oxygenate components, such as MTBE, are more soluble than the hydrocarbon components. Ethanol has greater solubility in water than hydrocarbon components or other oxygenate components.		Viscosity (cSt @ 40°C)	

Flash Point Closed cup: -43°C (-45°F). (Tagliabue [ASTM D-56]) Average Density at 60°F = 6.0 to 6.4 lbs./gal. (ASTM
Additional Properties D-2161)

SECTION 10. STABILITY AND REACTIVITY

Chemical Stability Stable. **Hazardous Polymerization** Not expected to occur.

Conditions to Avoid Keep away from heat, flame and other potential ignition sources. Keep away from strong oxidizing
Materials Incompatibility conditions and agents.
Hazardous Strong acids, alkalies and oxidizers such as liquid chlorine, other halogens, hydrogen peroxide and
Decomposition oxygen.
Products No additional hazardous decomposition products were identified other than the combustion products
 identified in Section 5 of this MSDS.

SECTION 11. TOXICOLOGICAL INFORMATION

For other health-related information, refer to the **Emergency Overview on Page 1** and the **Hazards Identification in Section 3** of
 this MSDS.

Toxicity Data

Gasoline:

VAPOR (TELo) Acute: 140 ppm (Human) (8 hours) - Mild eye irritant.
 VAPOR (TELo) Acute: 500 ppm (Human) (1 hour) - Moderate eye irritant.
 INHALATION (TCLo) Acute: 900 ppm (Human) (1 hour) - CNS and pulmonary effects.
 DERMAL (TDLo) Acute: 53 mg/kg (Human) - Skin allergy effects.
 INHALATION (LC50) Acute: 101,200 ppm (Rat, Mouse, & Guinea Pig) (5 minutes).

Gasoline Containing 15% MTBE:

ORAL (LD50) Acute: >5,000 mg/kg (Rat screen level). DERMAL (LD50) Acute: >2,000 mg/kg
 (Rabbit screen level). INHALATION (LC50) Acute: >5,200 ppm (Rat screen level) (8 hours). DRAIZE
 EYE Acute: Mild eye irritant. (Rabbit).

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DRAIZE DERMAL Acute: Moderate skin irritant. (Rabbit). BUEHLER DERMAL Acute: Non-sensitizing. (Guinea Pig). 28-Day DERM
 Sub-Chronic: Severe skin irritant. (Rabbit).

A major epidemiological study concluded that there was no increased risk of kidney cancer associated with gasoline exposures for
 petroleum refinery employees or neighboring residents. Another study identified a slight trend in kidney cancers among service stati
 employees following a 30-year latency period. Two-year inhalation toxicity studies with fully vaporized unleaded gasoline (at
 concentrations of 67, 292 and 2,056 ppm in air) produced kidney damage and kidney tumors in male rats, but not in female rats or
 mice of either sex. Results from subsequent scientific studies suggest that the kidney damage, and probably the kidney tumor
 response, is limited to the male rat. The kidney tumors apparently were the result of the formation of alpha-2u-globulin, a protein
 unique to male rats. This finding is not considered relevant to human exposure. Under conditions of the study, there was no evident
 that exposure to unleaded gasoline vapor is associated with developmental toxicity. Experimental studies with laboratory animals di
 suggest that overexposure to gasoline may adversely effect male reproductive performance. Also, in laboratory studies with rats, th
 maternal and developmental "no observable adverse effect level" (NOAEL) was determined to be 9,000 ppm (75% of the LEL value
 Female mice developed a slightly higher incidence of liver tumors compared to controls at the highest concentration. In a four week
 inhalation study of Sprague Dawley® rats, gasoline vapor condensate was determined to induce sister chromatid exchanges in
 peripheral lymphocytes. IARC has listed gasoline as possibly carcinogenic to humans (Group 2B).

Pentanes, all isomers:

Studies of pentane isomers in laboratory animals indicate exposure to extremely high levels (roughly 10 vol.%) may induce cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

Toluene:

Effects from Acute Exposure:

Deliberate inhalation of toluene at high concentrations (e.g., glue sniffing and solvent abuse) has been associated with adverse effects on the liver, kidney and nervous system and can cause CNS depression, cardiac arrhythmias and death. Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects.

Effects from Repeated or Prolonged Exposure:

Studies of workers indicate long-term exposure may be related to impaired color vision and hearing. Some studies of workers suggest long-term exposure may be related to neurobehavioral and cognitive changes. Some of these effects have been observed in laboratory animals following repeated exposure to high levels of toluene. Several studies of workers suggest long-term exposure may be related to small increases in spontaneous abortions and changes in some gonadotropic hormones. However, the weight of evidence does not indicate toluene is a reproductive hazard to humans. Studies in laboratory animals indicate some changes in reproductive organs following high levels of exposure, but no significant effects on mating performance or reproduction were observed. Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Findings in laboratory animals were largely negative. Positive findings include small increases in minor skeletal and visceral malformations and developmental delays following very high levels of maternal exposure. Studies of workers indicate long-term exposure may be related to effects on the liver, kidney and blood, but these appear to be limited to changes in serum enzymes and decreased leukocyte counts. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland following very high levels of exposure. The relevance of these findings to humans is not clear at this time.

Heptane, all isomers:

n-Heptane was not mutagenic in the Salmonella/microsome (Ames) assay and is not considered to be carcinogenic.

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Xylene, all isomers:

Effects from Acute Exposure:

ORAL (LD50), Acute: 4,300 mg/kg [Rat].

INHALATION (LC50), Acute: 4,550 ppm for four hours [Rat].

DERMAL (LD50), Acute: 14,100 uL/kg [Rabbit]. Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, CNS damage and narcosis. Effects may be increased by the use of alcoholic beverages. Evidence of liver and kidney impairment were reported in workers recovering from a gross over-exposure.

Effects from Prolonged or Repeated Exposure:

Impaired neurological function was reported in workers exposed to solvents including xylene. Studies in laboratory animals have shown evidence of impaired hearing following high levels of exposure. Studies in laboratory animals suggest some changes in reproductive organs following high levels of exposure but no significant effects on reproduction were observed. Studies in laboratory animals indicate skeletal and visceral malformations, developmental delays, and increased fetal resorptions following extremely high levels of maternal exposure. Adverse effects on the liver, kidney, bone marrow (changes in blood cell parameters) were observed in laboratory animals following high levels of exposure. The relevance of these observations to humans is not clear at this time.

Ethyl tertiary Butyl Ether (ETBE):

ETBE can cause eye, skin and mucous membrane irritation. In a four week inhalation study, moderate ataxia was observed in rats at the highest dose level (4,000 ppm). The test animals appeared normal within 15 minutes of termination of exposure. A no observed adverse effect level (NOAEL) of 500 ppm was indicated by the study authors based on neurotoxic effects. In two unpublished 90 day inhalation studies, rats and mice were exposed six hours/day, five days/week at concentrations of 0, 500, 1750 and 5000 ppm of ETBE vapor. The male rats exhibited time and concentration-dependent nephropathy consistent with alpha-2u-globulin formation. An ETBE NOAEL for male rats of 500 ppm was suggested based on a finding of testicular lesions. In human studies with eight males, slight, but significant ($p < 0.05$) decreases in objective pulmonary function measures after exposure to ETBE at concentrations of 25 and 50 ppm

for two hours.

Tertiary-Amyl Methyl Ether (TAME):

TAME was found to be negative for the induction of structural chromosome aberrations (both metabolically-activated and non-activated) in Chinese hamster ovary (CHO) cells. Inhalation of TAME vapors at concentrations above 250 ppm produced reversible CNS depression in rats and mice. In a four week inhalation study, increases in liver weights with no tissue injury were observed in rats exposed to a TAME concentration of 500 ppm. Birth defects in mice and fetotoxicity in both rats and mice were observed after inhalation exposures to maternally toxic concentrations of TAME.

Methyl tertiary-Butyl Ether (MTBE):

Acute symptoms associated with human exposure to MTBE appear to be mild and transient. In laboratory studies, rats and mice exposed to high doses of MTBE exhibited blood chemistry changes and liver and kidney abnormalities. In laboratory studies, MTBE vapor exposure at the high dose concentration was associated with an increased incidence of liver tumors in female mice. Also, at high dose concentration exposures, MTBE was associated with an increased incidence of kidney and testicular (Leydig cell) tumors in male rats. Additional oncogenicity studies on rats resulted in testicular tumors following administration by ingestion. These data are not generally considered relevant to humans. NTP has not identified MTBE as either a known carcinogen or reasonably anticipated to be carcinogenic to humans. In animal studies, developmental and reproductive toxicity related to MTBE inhalation exposures was observed only at concentrations that were maternally toxic. MTBE was shown to be maternally toxic at 4,000 and 8,000 ppm levels when mice were exposed for six hours per day during their pregnancy. Also, a decrease in the number of successful pregnancies and a reduction in birth weights were observed at these exposure levels. Birth defects (cleft palate) were observed at the high dose level. These data suggest that the risk of developmental and reproductive toxicity in humans is negligible as a result of anticipated

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exposures to MTBE.

Diisopropyl Ether (DIPE):

Increased kidney and liver weights were observed in rats and mice in subchronic and chronic inhalation studies of DIPE. Also, evidence of microscopic changes (hyaline droplets) were reported in liver tissue and kidney tubules of rabbits and male rats exposed to DIPE at concentrations of 7,100 ppm. These findings were similar those found in gasoline studies. Overexposure by inhalation of pregnant rats to DIPE at concentrations of 3,095 and 6,745 ppm increased the frequency of rudimentary 14th ribs in the offspring. This effect was not observed at exposure concentrations of 430 ppm. The significance of these findings to human exposure is unclear.

Ethanol:

Inhalation exposure to ethanol vapor at concentrations above applicable workplace exposure levels is expected to produce eye and mucus membrane irritation. Human exposure at concentrations from 1000 to 5000 ppm produced symptoms of narcosis, stupor and unconsciousness. Subjects exposed to ethanol vapor in concentrations between 500 and 10,000 ppm experienced coughing and smarting of the eyes and nose. At 15,000 ppm there was continuous lacrimation and coughing. While extensive acute and chronic effects can be expected with ethanol consumption, ingestion is not expected to be a significant route of exposure to this product.

Butane, all isomers:

Studies in laboratory animals indicate exposure to extremely high levels of butanes (1-10 or higher vol.% in air) may cause cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

n-Hexane:

This material contains n-hexane. Long-term or repeated exposure to n-hexane can cause permanent peripheral nerve damage. Initial symptoms are numbness of the fingers and toes. Also, motor weakness can occur in the digits, but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. Co-exposure to methylethyl ketone or methyl isobutyl ketone increases the neurotoxic properties of n-hexane. In laboratory studies, prolonged exposure to elevated concentrations of n-hexane was associated with decreased sperm count and degenerative changes in the testicles of rats.

Cumene:

Effects from Acute Exposure:

Overexposure to cumene may cause upper respiratory tract irritation and severe CNS

depression.

Effects from Prolonged or Repeated Exposure:

Studies in laboratory animals indicate evidence of adverse effects on the kidney and adrenal glands following high level exposure. The relevance of these findings to humans is not clear at this time.

Trimethylbenzenes, all isomers:

Studies of Workers:

Levels of total hydrocarbon vapors present in the breathing atmosphere of these workers ranged from 10 to 60 ppm. The TCLo for humans is 10 ppm, with somnolence and respiratory tract irritation noted.

Studies in Laboratory Animals:

In inhalation studies with rats, four of ten animals died after exposures of 2400 ppm for 24 hours. An oral dose of 5 mL/kg resulted in death in one often rats. Minimum lethal intraperitoneal doses were 1.5 to 2.0 mL/kg in rats and 1.13 to 12 mL/kg in guinea pigs. Mesitylene (1,3,5 Trimethylbenzene) inhalation at concentrations of 1.5, 3.0, and 6.0 mg/L for six hours was associated with dose-related changes in white blood cell counts in rats. No significant effects on the complete blood count were noted with six hours per day exposure

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for five weeks, but elevations of alkaline phosphatase and SGOT were observed. Central nervous system depression and ataxia were noted in rats exposed to 5,100 to 9,180 ppm for two hours.

Benzene:

ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse].

INHALATION (LC50):

(VAPOR): Acute: 10000 ppm 7 hour(s) [Rat]. 9980 ppm 8 hour(s) [Mouse].

Studies of Workers Over-Exposed to Benzene:

Studies of workers exposed to benzene show clear evidence that over-exposure can cause cancer of the blood forming organs (acute myelogenous leukemia) and aplastic anemia, an often fatal disease. Studies also suggest over-exposure to benzene may be associated with other types of leukemia and other blood disorders. Some studies of workers exposed to benzene have shown an association with increased rates of chromosome aberrations in circulating lymphocytes. One study of women workers exposed to benzene suggested a weak association with irregular menstruation. However, other studies of workers exposed to benzene have not demonstrated clear evidence of an effect on fertility or reproductive outcome in humans. Benzene can cross the placenta and affect the developing fetus. Cases of aplastic anemia have been reported in the offspring of persons severely over-exposed to benzene.

Studies in Laboratory Animals:

Studies in laboratory animals indicate that prolonged, repeated exposure to high levels of benzene vapor can cause bone marrow suppression and cancer in multiple organ systems. Studies in laboratory animals show evidence of adverse effects on male reproductive organs following high levels of exposure but no significant effects on reproduction have been observed. Embryotoxicity has been reported in studies of laboratory animals but effects were limited to reduced fetal weight and skeletal variations.

Ethyl benzene:

Effects from Acute Exposure:

ORAL (LD50), Acute: 3,500 mg/kg [Rat].

DERMAL (LD50), Acute: 17,800 uL/kg [Rabbit].

INTRAPERITONEAL (LD50), Acute: 2,624 mg/kg [Rat].

Effects from Prolonged or Repeated Exposure:

Findings from a 2-year inhalation study in rodents conducted by NTP were as follows: Effects were observed only at the highest exposure level (750 ppm). At this level the incidence of renal tumors was elevated in male rats (tubular carcinomas) and female rats (tubular adenomas). Also, the incidence of tumors was elevated in male mice (alveolar and bronchiolar carcinomas) and female mice (hepatocellular carcinomas). IARC has classified ethyl benzene as "possibly carcinogenic to humans" (Group 2B). Studies in laboratory animals indicate some evidence of post-implantation deaths following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate limited evidence of renal malformations, resorptions, and

developmental delays following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland.

Cyclohexane:

Cyclohexane can cause eye, skin and mucous membrane irritation, CNS depressant and narcosis at elevated concentrations. In experimental animals exposed to lethal concentrations by inhalation or oral route, generalized vascular damage and degenerative changes in the heart, lungs, liver, kidneys and brain were identified.

Cyclohexane has been the focus of substantial testing in laboratory animals. Cyclohexane was not found to be genotoxic in several tests including unscheduled DNA synthesis, bacterial and mammalian cell mutation assays, and in vivo chromosomal aberration. An increase in chromosomal aberrations in bone marrow cells of rats exposed to cyclohexane

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was reported in the 1980's. However, a careful re-evaluation of slides from this study by the laboratory which conducted the study indicates these findings were in error, and that no significant chromosomal effects were observed in animals exposed to cyclohexane. Findings indicate long-term exposure to cyclohexane does not promote dermal tumorigenesis.

Naphthalene:

Studies in Humans Overexposed to Naphthalene:

Severe jaundice, neurotoxicity (kernicterus) and fatalities have been reported in young children and infants as a result of hemolytic anemia from over-exposure to naphthalene. Persons with Glucose 6-phosphate dehydrogenase (G6PD) deficiency are more prone to the hemolytic effects of naphthalene. Adverse effects on the kidney have also been reported from over-exposure to naphthalene but these effects are believed to be a consequence of hemolytic anemia, and not a direct effect.

Studies in Laboratory Animals:

Hemolytic anemia has been observed in laboratory animals exposed to naphthalene. Laboratory rodents exposed to naphthalene vapor for 2 years (lifetime studies) developed non-neoplastic and neoplastic tumors and inflammatory lesions of the nasal and respiratory tract. Cataracts and other adverse effects on the eye have been observed in laboratory animals exposed to high levels of naphthalene. Findings from a large number of bacterial and mammalian cell mutation assays have been negative. A few studies have shown chromosomal effects (elevated levels of Sister Chromatid Exchange or chromosomal aberrations) *in vitro*.

Styrene:

Neurological injury associated with chronic styrene exposure include distal hypesthesia, decreased nerve conduction velocity, and altered psychomotor performance. These effects did not occur with exposures to airborne concentrations that were less than 100 ppm. Increased deaths from degenerative neurological disorders were found in a comprehensive epidemiological study of Danish reinforced plastics workers. These workers were reported to have a 2.5-fold increased risk for myeloid leukemia with clonal chromosome aberrations. Also, there are several studies that suggest potential reproductive effects in humans and experimental animals from overexposure to styrene. Styrene was not mutagenic in the standard (liquid phase) Ames Salmonella/microsome assay, but was weakly positive when tested in the vapor phase. IARC has listed styrene as possibly carcinogenic to humans (Group 2B).

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Unleaded gasoline is potentially toxic to freshwater and saltwater ecosystems. Various grades of gasoline exhibited range of lethal toxicity (LC100) from 40 PPM to 100 PPM in ambient stream water with Rainbow Trout (*Salmo irideus*). A 24-hour TLm (Median Toxic Limit) was calculated to be 90 PPM with juvenile American Shad (*Squalius cephalus*). In Bluegill Sunfish (*Lepomis macrochirus*), Grey Mullet (*Chelon labrosus*) and Gulf Menhaden (*Brevoortia patronus*), gasoline exhibited a 96-hour LC50 of 8 PPM, 2 PPM, and 2 PPM, respectively.

The aquatic toxicity of Methyl tertiary-Butyl Ether (MTBE) is considered to be relatively low. In the crustacean Harpacticoid Copepods (*Nitrocrora spinipes*), MTBE exhibited an LC50 (96-hour) of 1,000 PPM to 10,000 PPM depending upon various water temperatures. In Bleak Fish (*Alburnus alburnus*), MTBE exhibited an LC50 (24-hour) of 1,700 PPM and an LC50 (96-hour) of 1,000 PPM at 10° C. In Golden Orfe Fish (*Leuciscus idus melanotus*), MTBE exhibited an LC50 (48-hour) of 1,000 PPM and an LC₁₀₀ of 2,000 PPM.

Environmental Fate

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Avoid spilling gasoline. Spilled gasoline can result in environmental damage. Spilled gasoline can penetrate soil and contaminate ground water. Although gasoline is biodegradable, it may persist for prolonged time periods, particularly where oxygen levels are reduced. The hydrocarbon components of gasoline are slightly soluble in water. Gasoline hydrocarbon components do not readily dissolve in water but can be adsorbed to soils.

Gasoline contains components that are potentially toxic to freshwater and saltwater ecosystems. It will normally float on water. The components of gasoline will evaporate rapidly. Evaporated hydrocarbon components may contribute to atmospheric smog. MTBE and other oxygenates are more soluble than other gasoline components. In addition, oxygenates such as MTBE do not adsorb to soils, sediments or suspended particulate matter as readily as other gasoline components. MTBE does not degrade as readily as other gasoline components once in ground water or subsoil. MTBE is not expected to bioconcentrate in the aquatic environment.

SECTION 13. DISPOSAL CONSIDERATIONS

Hazard characteristic and regulatory waste stream classification can change with product use. Accordingly, it is the responsibility of the user to determine the proper storage, transportation, treatment and/or disposal methodologies for spent materials and residues at the time of disposition.

Maximize material recovery for reuse or recycling. Recovered non-usable material may be regulated by US EPA as a hazardous waste due to its ignitibility (D001) and/or its toxic (D018) characteristics. Conditions of use may cause this material to become a "hazardous waste", as defined by federal or state regulations. It is the responsibility of the user to determine if the material is a RCRA "hazardous waste" at the time of disposal. Transportation, treatment, storage and disposal of waste material must be conducted in accordance with RCRA regulations (see 40 CFR 260 through 40 CFR 271). State and/or local regulations may be more restrictive. Contact your regional US EPA office for guidance concerning case specific disposal issues.

SECTION 14. TRANSPORT INFORMATION

The shipping description below may not represent requirements for all modes of transportation, shipping methods or locations outside of the United States.

US DOT Status A U.S. Department of Transportation regulated material.
Proper Shipping Name Gasoline, 3, UN 1203, PG II
 Gasohol, 3, NA 1203, PGII (Use only for gasoline blended with less than 20% ethanol)
Hazard Class 3 DOT Class: Flammable liquid. **Packing Group(s) II**
UN/NA Number UN1203 or NA1203
Reportable Quantity A Reportable Quantity (RQ) has not been established for this material.
Placard(s) ^s^ **Emergency Response** 128
Guide No.
MARPOL III Status Not a DOT "Marine
 Pollutant" per 49 CFR 171.8.



CITGO Gasolines, All Grades Unleaded**SECTION 15. REGULATORY INFORMATION**

TSCA Inventory
SARA 302/304 Emergency
Planning and Notification
SARA 311/312 Hazard
Identification
SARA 313 Toxic Chemical
Notification and Release
Reporting
CERCLA
Clean Water Act (CWA)

This product and/or its components are listed on the Toxic Substances Control Act (TSCA) inventory.

The Superfund Amendments and Re authorization Act of 1986 (SARA) Title III requires facilities subject to Subparts 302 and 304 to submit emergency planning and notification information based on Threshold Planning Quantities (TPQs) and Reportable Quantities (RQs) for "Extremely Hazardous Substances" listed in 40 CFR 302.4 and 40 CFR 355. No components were identified.

The Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III requires facilities subject to this subpart to submit aggregate information on chemicals by "Hazard Category" as defined in 40 CFR 370.2. This material would be classified under the following hazard categories: fire, Acute (Immediate) Health Hazard, Chronic (Delayed) Health Hazard

This product contains the following components in concentrations above de minimis levels that are listed as toxic chemicals in 40 CFR Part 372 pursuant to the requirements of Section 313 of SARA:

Toluene [CAS No.: 108-88-3] Concentration: <20%

Xylene, all isomers [CAS No.: 1330-20-7] Concentration: <18%

Methyl tertiary-Butyl Ether (MTBE) [CAS No.: 1634-04-4] Concentration: <15%

n-Hexane [CAS No.: 110-54-3] Concentration: <8%

Cumene [CAS No.: 98-82-8] Concentration: <4%

Benzene [CAS No.: 71-43-2] Concentration: <5%

Ethylbenzene [CAS No.: 100-41-4] Concentration: <4%

1, 2, 4 Trimethylbenzene [CAS No.: 95-63-6] Concentration: <4%

Cyclohexane [CAS No.: 110-82-7] Concentration: <3%

Naphthalene [CAS No.: 91-20-3] Concentration: <2%

Styrene [CAS No.: 100-42-5] Concentration: <1%

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires notification of the National Response Center concerning release of quantities of "hazardous substances" equal to or greater than the reportable quantities (RQ's) listed in 40 CFR 302.4. As defined by CERCLA, the term "hazardous substance" does not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically designated in 40 CFR 302.4. Chemical substances present in this product or refinery stream that may be subject to this statute are:

Toluene [CAS No.: 108-88-3] RQ = 1000 lbs. (453.6 kg) Concentration: <20%

Xylene, all isomers [CAS No.: 1330-20-7] RQ = 100 lbs. (45.36 kg) Concentration: <18%

Methyl tertiary-Butyl Ether (MTBE) [CAS No.: 1634-04-4] RQ = 1000 lbs. (453.6 kg) Concentration: <15%

n-Hexane [CAS No.: 110-54-3] RQ = 5000 lbs. (2268 kg) Concentration: <8%

2,2,4-Trimethylpentane [CAS No.: 540-84-1] RQ = 1000 lbs. (453.6 kg) Concentration: <5%

Benzene [CAS No.: 71-43-2] RQ = 10 lbs. (4.536 kg) Concentration: <5%

Cumene [CAS No.: 98-82-8] RQ = 5000 lbs. (2268 kg) Concentration: <4%

Ethylbenzene [CAS No.: 100-41-4] RQ = 1000 lbs. (453.6 kg) Concentration: <4%

Cyclohexane [CAS No.: 110-82-7] RQ = 1000 lbs. (453.6 kg) Concentration: <3%

Naphthalene [CAS No.: 91-20-3] RQ = 100 lbs. (45.36 kg) Concentration: <2%

Styrene [CAS No.: 100-42-5] RQ = 1000 lbs. (453.6 kg) Concentration: <1%
 This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

California Proposition 65

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New Jersey Right-to-Know Label This material may contain the following components which are known to the State of California to cause cancer, birth defects or other reproductive harm, and may be subject to the requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5): Gasoline (Wholly Vaporized and Engine Exhaust), Benzene [CAS No. 71-43-3], Toluene [CAS No. 108-88-3], Ethylbenzene [CAS No. 100-41-4] and Naphthalene [CAS No. 91-20-3]
Additional Regulatory Remarks Gasoline [NJDEP CAS No. 8006-61-9]

As minimum requirements, CITGO recommends that the following advisory information be displayed on equipment used to dispense gasoline in motor vehicles. Additional warnings specified by various regulatory authorities may be required: "DANGER: Extremely Flammable. Use as a Motor Fuel Only. No Smoking. Stop Engine. Turn Off All Electronic Equipment including Cellular Telephones. Do Not Overfill Tank. Keep Away from Heat and Flames. Do Not leave nozzle unattended during refueling. **Static Sparks Can Cause a Fire, especially when filling portable containers.** Containers must be metal or other material approved for storing gasoline. PLACE CONTAINER ON GROUND. DO NOT FILL ANY PORTABLE CONTAINER IN OR ON A VEHICLE. Keep nozzle spout in contact with the container during the entire filling operation. **Harmful or Fatal if Swallowed. Long-Exposure Has Caused Cancer in Laboratory Animals.** Avoid prolonged breathing of vapors. Keep face away from nozzle and gas tank. Never siphon by mouth." WHMIS Class B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). WHMIS Class D-2B: Material causing other toxic effects (TOXIC).

SECTION 16. OTHER INFORMATION

Refer to the top of Page 1 for the HMIS and NFPA Hazard Ratings for this product.

REVISION INFORMATION

Version Number 7.0
 Revision Date 05/23/2005
 Print Date Printed on 05/23/2005.

ABBREVIATIONS

AP: Approximately EQ: Equal >: Greater Than <: Less Than ACGIH: American Conference of Governmental Industrial Hygienists IARC: International Agency for Research on Cancer NIOSH: National Institute of Occupational Safety and Health NPCA: National Paint and Coating Manufacturers Association NFPA: National Fire Protection Association

Not Applicable ND: No Data NE: Not Established AIHA: American Industrial Hygiene Association NTP: National Toxicology Program OSHA: Occupational Safety and Health Administration HMIS: Hazardous Materials Information System EPA: US Environmental Protection Agency

DISCLAIMER OF LIABILITY

THE INFORMATION IN THIS MSDS WAS OBTAINED FROM SOURCES WHICH WE BELIEVE ARE RELIABLE. HOWEVER, THE

INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESSED OR IMPLIED REGARDING ITS CORRECTNESS. SOME INFORMATION PRESENTED AND CONCLUSIONS DRAWN HEREIN ARE FROM SOURCES OTHER THAN DIRECT TEST DATA ON THE SUBSTANCE ITSELF. THIS MSDS WAS PREPARED AND IS TO BE USED ONLY FOR THIS PRODUCT. IF THE PRODUCT IS USED AS A COMPONENT IN ANOTHER PRODUCT, THIS MSDS INFORMATION MAY NOT BE APPLICABLE. USERS SHOULD MAKE THEIR OWN INVESTIGATIONS TO DETERMINE THE SUITABILITY OF THE INFORMATION OR PRODUCTS FOR THEIR PARTICULAR PURPOSE.

THE CONDITIONS OR METHODS OF HANDLING, STORAGE, USE, AND DISPOSAL OF THE PRODUCT ARE BEYOND OUR CONTROL AND MAY BE BEYOND OUR KNOWLEDGE. FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.

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END OF MSDS

COMMUNITY RELATIONS PLAN

COMMUNITY RELATIONS PLAN

The Sampling Plan is to be completed in accordance with the Consent Decree-Remedial Action Plan for Reilly Tar & Chemical Corporation's St. Louis Park, Minnesota, N.P. L. Site. All community relations programs related to this work will be coordinated through the following agencies:

United States	Ms. Denise Gawlinski United States Environmental Protection Agency (312) 886-9859
State of Minnesota	Ms. Katherine Carlson Minnesota Pollution Control Agency (651) 297-1607
City of St. Louis Park	Ms. Lynn Schwartz City of St. Louis Park (952) 924-2521

Information necessary to conduct the Community Relations Plan will be provided by the City and Reilly Industries, Inc.